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THE IRON AGE

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... THE IRON AGE ...

JANUARY 12, 1939

ESTABLISHED 1855 Vol. 143, No. 2

Take Off the Whiskers—We Know You!

SOME six years ago, THE IRON AGE drove the first nail into the coffin of Technocracy. Some of you will remember it.

Technocracy then, in the distressed days of the depression, was a bogeyman that terrified a considerable part of our population with the prediction that "chaos was bound to come in 18 months." Who could fail to be impressed by such opinions emanating from a "Doctor of Science" capable of impressing his importance sufficiently to have Columbia University donate space for his researches and the *"New Outlook"* under Editor Alfred E. Smith, provide pages for the airing of his views?

And so the theories of the Technocrats gained considerable credence in high circles and low, due perhaps to the exceedingly original and fantastic patter of semi-scientific jargon in which they were couched and due more so, perhaps, to the truism of Barnum's that "there is one born every minute and two to take him."

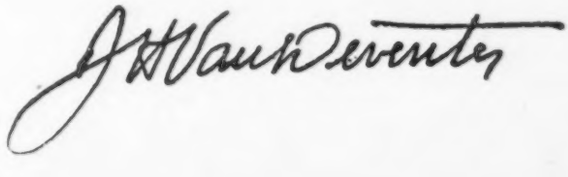
Gained credence, as I have said, until THE IRON AGE exposed the statistical fallacies that the public was so avidly swallowing and until Allen Raymond, of the New York *Herald Tribune* followed by exposing the interesting and until then unknown antecedents of the cult's chief "medicine man."

And so, Technocracy and its chief apostle, Scott, were apparently firmly nailed into a coffin and interred. Dead and buried. But the hardest thing to kill and to bury in this credulous world is a fallacy.

When an individual is dead and buried, he goes to the promised land, or rather to one of the two of them. When you bury a fallacy, it moves to California, preferably to Los Angeles, where so many economic fallacies are reincarnated. To the home and birthplace of the Townsend Plan and the Sinclair Plan and the Ham and Egg Plan.

And so now we see the reincarnation of Technocracy spreading its teachings to the gullible again, this time from West to East instead of from East to West as in the first instance. But with this difference: The date of chaos has been put forward. Instead of being sometime in 1933, as at first predicted, the event is now set by Chief Technocrat Scott for 1942.

All we can say is that if a group of super-scientists can't hit such an important date as chaos within a margin of error of less than nine years, we prefer to depend on Dr. Ayers' Almanac.



Prominent Railroad President Cites Advantages of High Tensile Steels

Comparing freight cars built of ordinary steel by a leading Railroad in 1928 with 1,000 new cars built by the same road in 1937, using high tensile low alloy steels, the President of the Railroad said:

"The new cars are stronger, possess greater durability and yet are 24% lighter per cu. ft. of carrying capacity than those built of ordinary steel 10 years ago."

We are proud of the fact that a large tonnage of Inland Hi-Steel was used in the construction of these new cars.

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SHEETS STRIP TIN PLATE BARS PLATES FLOOR PLATES STRUCTURALS PILING RAILS TRACK ACCESSORIES REINFORCING BARS

Finish Processing of Ordnance and Tubing Bores

By KIRKE W. CONNOR
President, Micromatic Hone Corp., Detroit

IN the development of recent methods of ordnance processing, the author has been particularly interested in accomplishments in final finish of gun bores and certain aircraft parts. Recently he spent several months in Europe during which time he observed advances made through the use of new tools, many American-built. In this paper, which he has presented privately and at greater length to interested groups, Mr. Connor discusses some military applications of honing. Included also is discussion of a method of finishing forged steel barrels of new automatic type rifles. Many readers will be interested in correlating this information with data on Superfinish published in THE IRON AGE on Sept. 1, 8 and 22, 1938. The second part of this article will appear in an early issue.

COMBINED processing and final finishing of tubing bores represents one of the most difficult problems in industry. The major part of this work has been confined to the manufacture of gun ordnance, comprising recoil mechanism cylinders, such as recuperator and buffer cylinders, anti-aircraft gun barrels, small rifle bores, large caliber gun liners, and large caliber gun casings. Materials commonly used in these parts include soft steel and monel metal, and hardened steel forgings. Some processing of external cylindrical parts, such as piston rods for recuperator cylinders, is involved in securing a high degree of precision fit in assembled parts. The work varies from 0.300 to 30 in. in diameter and from 2 to approximately 75 ft. in length.

While the fundamental principles of ordinary machining methods are used in these applications, they represent especially engineered adaptations and techniques developed over a long period of time in various ordnance factories. Government regulations universally preclude the possibility of showing installation views of various methods of processing, and exact data on accomplishment cannot be revealed. It is interesting, however, to examine the general features and relative accomplishments which have been indicated in some of the operations. First, however, the process of honing will be reviewed.

The Honing Process

The honing process is fundamentally a wet cutting process, and in its present stage of development comprises various methods of controlled, mechanical application of bonded abrasive on internal surfaces of cylinder bores, and on the external surfaces of cylindrical parts. It combines fourfold accomplishment in one process: it removes substantial amounts of stocks, generates size, generates accuracy for roundness and straightness, and produces any desired degree of surface smoothness. It is not conventionally an alinement generating process as related to squareness, concentricity, or parallelism of axes in adjacent bores.

A number of abrasive sticks are used in conventional honing tools, and are of various widths, lengths, and thicknesses, as may be determined by construction limitations according to diameter of the work. The area of abrasive contact thus provided averages approximately 100 times that of a grinding operation on comparable sized work. This arrangement of a large number of cutting tips, permits the application of high total pressure, with resulting low unit pressure and the elimination of injurious frictional heat.

Stock removal by free-cutting action is obtained by keeping the abrasive contact area clean, or by allowing for a uniform rate of fracture of the individual grains and of the bond posts, thus maintaining sharp cutting edges during operation. Uniformly controlled cutting depth of the bonded grains is obtained by a multi-directional travel path of the sticks, in various combinations of rotations and traverses or reciprocations. Where desirable, the work may also be rotated or reciprocated, or both, in addition to the actuation of the honing tool. These combined motions serve to provide a

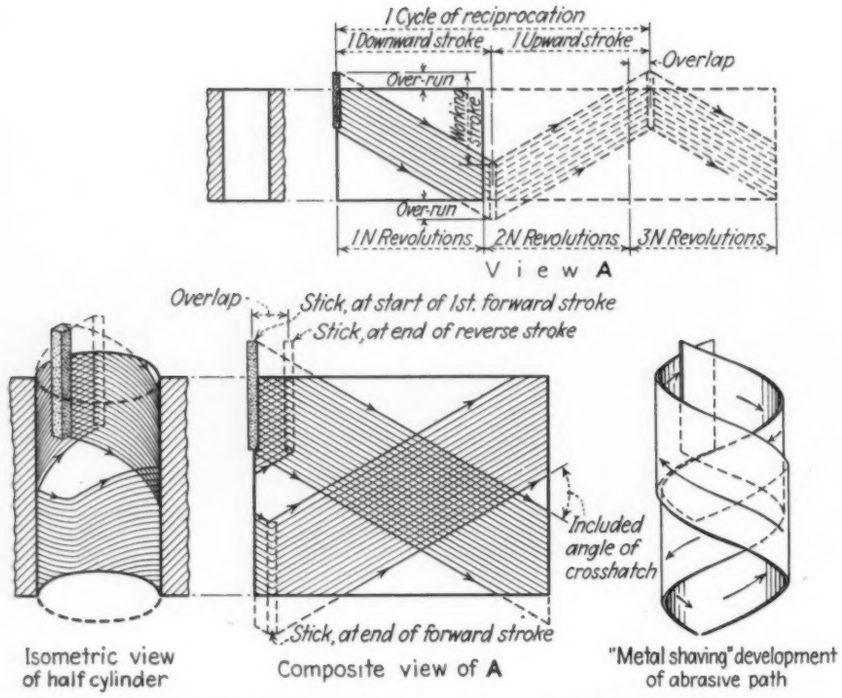


FIG. 1—Travel path of an abrasive stick in honing is resultant of combining simple rotation with a simultaneous reversing stroke or traverse of the tool. Particles of grit or abrasive do not cut uniform helices or follow previous paths. Stone frequently cleans itself.

universal force actuation on all individual grits, regardless of the angle of their cleavage planes to the work, and on all bond posts, thus accomplishing a uniform rate of fracture of the grits.

Analysis of Abrasive Travel

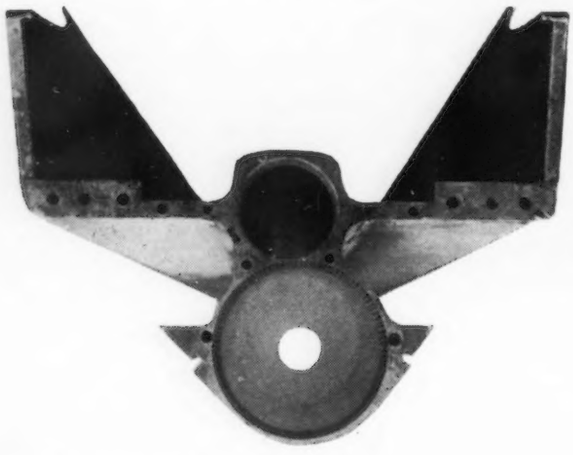
The simplest form of multi-directional actuation used in conventional applications is shown in Fig. 1, and combines a simple rotation with a simultaneous reversing stroke or traverse of the tool. This combined actuation causes the abrasive stick to follow the path of a wide angled helix of steep pitch. In many typical installations, the ratio of revolutions to reciprocations is from 3½ or 4 to 1. As here shown, for purposes of simplicity, the ratio is slightly more than 2 to 1. The area of crossing of these paths on the forward and reverse strokes produces a characteristic crosshatch of the cutting marks.

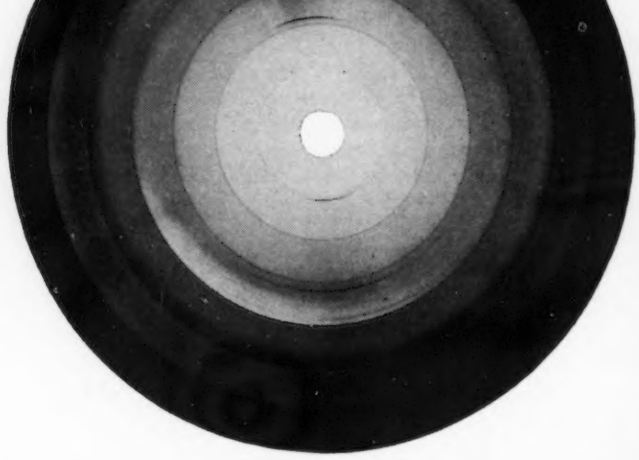
Surface speeds of abrasive travel in the honing process range from 10 to 250 ft. per min., depending upon the material, the desired accomplishment of stock removal and final surface finish.

The ability to control size in honing is accomplished by regulation of the expansion of the abrasive stone and its holder. This is usually arranged by having the expansion mechanism feed out to an adjustable limit stop in the tool. Accuracy for roundness is obtained by the rotary motion of the hone, and the controlled, positive expansion provided in the tool. Accuracy for diametric straightness is produced by the reciprocation of the hone, which permits the correction of taper error. Accuracy for axial straightness is accomplished by the use of sufficiently long stones to overcome any snakiness generated in the bore in previous processing operations.

The production of any desired degree of surface smoothness is controlled by adjustment of the cutting action of the abrasive. This may be accomplished in several ways, all of which comprise the reduction of penetration of the grits. Where the coolest, free-cutting action is desirable, it is customary to reduce the pressure while either slightly reducing the speed, or maintaining the same speed; with this method the viscosity of the coolant or lubricant supports the abrasive in a

FIG. 2—Micro-finished monel metal recoil mechanism cylinder. The enlargement shows typical annular rings produced by light reflection, as seen looking through a highly finished bore. Final finish marks measured parallel with the axis are approximately 1 to 3 micro-in. profilometer reading. Around the diameter, or across the straight-line honing marks, the reading is 5 to 7 micro-in.





manner to reduce or retard cutting action.

Finishing of Recoil Mechanism Bores

One of the major requirements in gun recoil mechanisms, including the recuperator and buffer cylinders, and of piston rods used in these cylinders, is that final assembly shall be so controlled as to permit the recoil mechanism to work perfectly after being sealed up under a fixed operating pressure, and after being stored for as long as 10 to 15 years. As this hydraulic pressure is usually not less than several thousand pounds per sq. in. in operation, the combined requirement for accuracy in machined parts, low tolerance sizing and fitting, and maximum smoothness of surface finish and mating of parts is of paramount importance.

Recoil mechanism cylinders for lower caliber artillery guns may be, for example, 2¾ in. in diameter by 60 or 70 in. long, and may be either monel metal or forged steel. Many of these parts are conventionally reamed within accuracy of 0.005 in. Previous to the time of using bonded abrasive or solid honing sticks, these bores were lapped with long lapping plugs to remove all annular or helical cutting marks, leaving the bore with all of the cutting mark lines running longitudinally parallel with the bore axis. This unusual requirement is said to be necessitated due to the use of pure silver as a facing material for the piston, packing or sealing parts. It is obvious that any annular or helical cutting marks in the bore would cause excessive rapid wear on a silver-faced part. The longitudinal cutting marks are intended to permit minimum wear in the mating of these two surfaces.

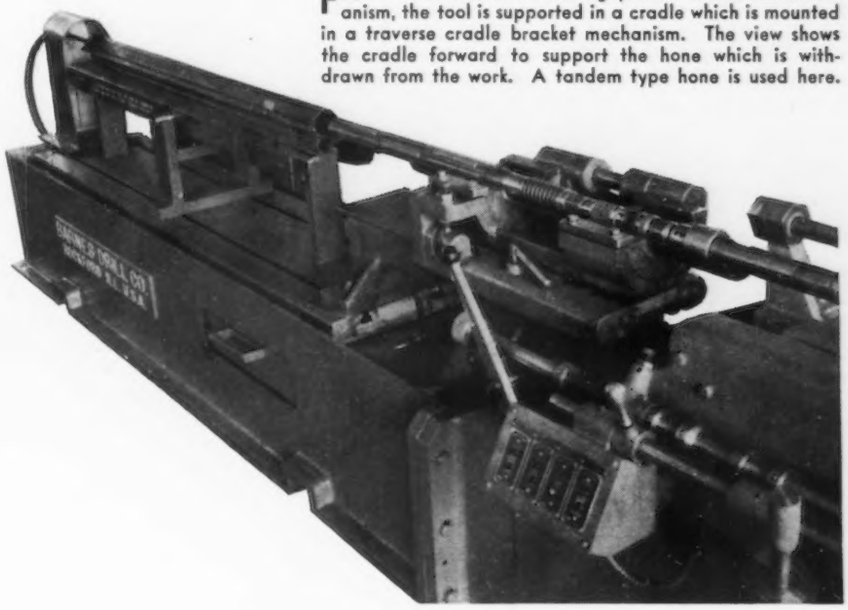


FIG. 3—For the 65-in. honing job on the recoil mechanism, the tool is supported in a cradle which is mounted in a traverse cradle bracket mechanism. The view shows the cradle forward to support the hone which is withdrawn from the work. A tandem type hone is used here.

Honing Now Used

In various gun factories throughout the world, the honing process is now used following boring or reaming of recoil cylinders. A rough honing operation is used for removal of stock for approximate diameter sizing, and a finishing operation for final diameter sizing and accuracy. These two honing operations are then followed by a third operation, using an adapted form of honing tool which is fitted with especially wide or interlocked stones. This tool is drawn lengthwise through the finish honed bore to accomplish the same straight line cutting marks which are obtained with the lapping process previously mentioned.

In typical applications on monel metal recoil mechanism cylinders of the type illustrated in Fig. 2, a total of 0.004 in. of stock can be removed in approximately 5 min. by rough honing, and 0.001 in. stock in 5 min. in the finish honing operation, following which the bore is finished by straight line honing tools in approximately one hour of operating time. In forged steel cylinders, about 0.010 in. total stock is removed in two honing operations in 30 min., and finished by straight line honing in 20 to 30 min. Accuracy is conventionally held with-

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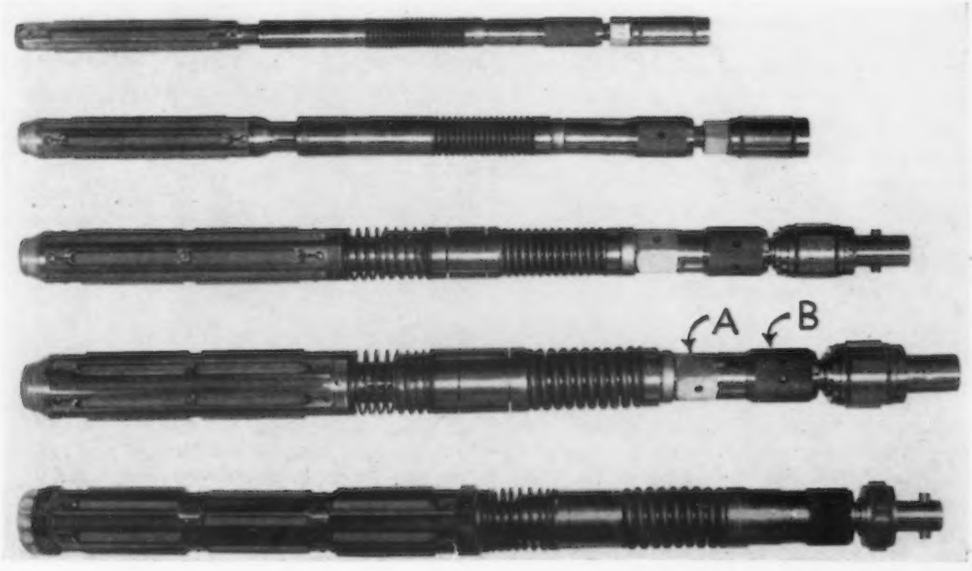

FIG. 4—Various models of mechanically operated honing tools for tubing work. Diameters range from 1¼ in. to 6 in. Selective limits of expansion are controlled by setting the ratchet collar (A) which is above the top coil spring. Expansion of the abrasive members to fit the work, or size reduction to remove the tool, is accomplished by a one-third turn of the adjustment ratchet (B).

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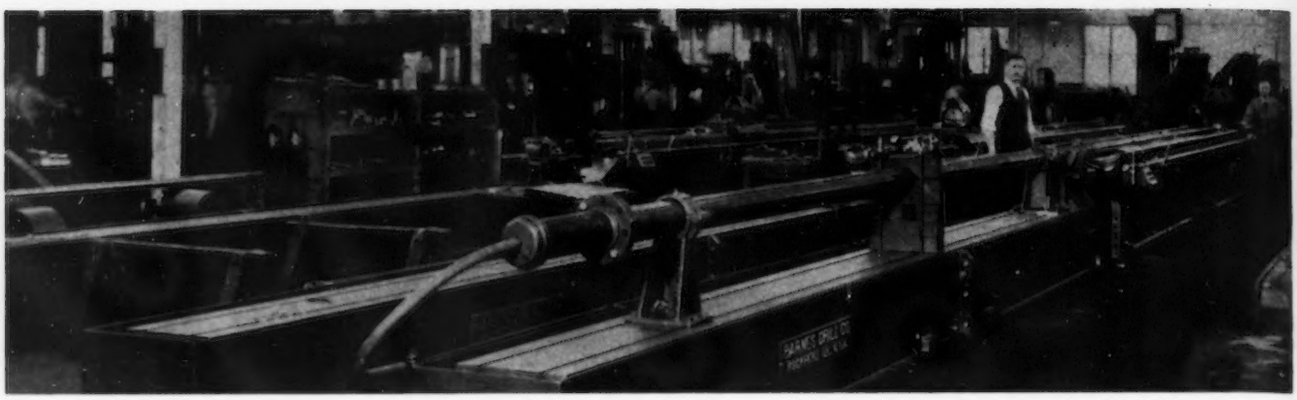


FIG. 5—Shop view of gun ordnance honing equipment with which rough bored gun tube was reconditioned in 2½ hr. As much as a week and a half formely was required for this job at the same arsenal. Final finish 5 micro-in.

in 0.0005 to 0.0007 in. for out-of-roundness and total taper.

Cost Data

Stone cost for approximately 0.009 in. stock removal on diameter by rough honing in a bore of 2¾ in. diameter by 65 in. long is approximately 0.7c. per cu. in. of stock removal, or 0.6c. per lineal inch; for finish honing, approximately 0.02c. per cu. in. or 0.1c. per lineal inch for 0.001 in. stock removal on diameter. Installation of a cradle supported hone for doing this work is shown in Fig. 3.

Various models of mechanically actuated honing tools for tubing work in these classifications are shown in Fig. 4.

Finishing Gun Bores

The generation of gun bores from solid steel forgings is a slow and costly process, requiring maximum maintenance of the tools and exceptional care in the various boring and reaming operations. It is reported that with a feed of 6 to 12 in. per hr. for a finish boring operation in a bore 4½ in. diameter by 17 ft. long, approximately 20 to 30 hr. of operating time per cut would be required.

The honing process has contributed important alterations in the finish processing of gun bores. Several installations have been made where it has been demonstrated that honing can follow at least a semi-finish boring operation, removing considerable stock in a small fraction of the time required for generating the cylinder bore.

This method of final processing has produced a startling degree of accomplishment in recent installations. In one recent test, in reconditioning a worn bore of a gun approximately 16 ft. long, it was found that the muzzle diameter was 4.457 in. and breach diameter 4.415 in., or approximately 0.042 in. total taper and an estimated 0.015 in. out-of-round. The bore had numerous hard spots caused by the intermittent heating and cooling in service. Approximately two weeks was required for reboring, during which time three cutter bars were twisted and broken, and the resulting rebore was indeed very rough, with a number of scored marks resulting from the boring operation.

FIG. 6—Latest type of equipment for honing large caliber guns is this hydraulically actuated tool. It will be used for an 18-in. gun tube 62 ft. long. Under development are tools for 30-in. bores 75 ft. long.

This roughly rebored gun was honed to 4.500 in. diameter by rough honing with mechanically actuated tools in 2½ hr., within accuracy of 0.0005 in. as measured every 10 in. throughout the length of the bore. Following this inspection, approximately 0.0005 to 0.0007 in. stock was removed by finish honing in 10 min., with final surface finish within approximately 5 micro-in. This processing has now replaced the previous method of lapping, following finish boring, which was used in a number of arsenals, and which required up to 1½ weeks. The equipment used in this installation is shown in Fig. 5.

In another recent test, hydraulically actuated honing tools were used to meet a more severe condition due to the fact that the metal in this gun had been cold worked. In this test, on a bore 6 in. in diameter by 258 in. long, a rough honing operation, following semi-finish boring, removed a total of 0.100 in. of stock on the diameter, at the rate of 0.012 to 0.014 in. per hr. Stone cost for this total amount of stock removal was computed at ½c. per cu. in., or 12.4c. per lineal foot. These bores are honed within final accuracy of 0.0005 in. for roundness and taper, measured, with both star and electric gages, every inch throughout the length of the bore. This test demonstrated the ability of the honing process to permit simplified processing

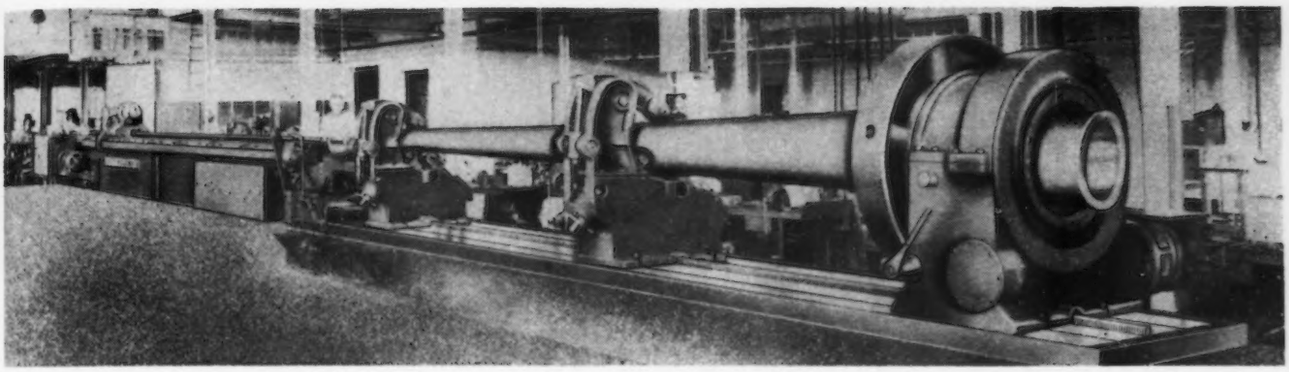


FIG. 7—Hydraulically reciprocated horizontal honing machine having 32 ft. working stroke and 32 ft. length of outboard work support table. Overall length of machine is approximately 80 ft. The outboard bed in this installation is arranged to be located in a pit. Clearance is provided for cleanouts, shown in phantom, for removing settlings of sediment from the coolant in the outboard bed. The machine has 36-in. distance from top of the table to center of the spindle. This capacity is the reason for setting the outboard bed in a pit as shown here.

by eliminating the slow, costly finish boring operation. Considering that it is not at all unusual for one of these forgings, which in the finished state may cost approximately $200,000, to be scrapped in finish boring, the features of control and safety provided by the honing process for final finish processing offer incomparable production advantages and economies. The latest type of equipment which has been developed for honing large caliber guns is shown in Fig. 6.

In large gun casings, it is interesting to observe that the use of honed finishes is now being considered increasingly desirable for the proper seating of gun liners. Thus, gun casings are now being honed in some arsenals. Honed finish is reported as accomplishing better fitting and seating of the liners in the casings, whether they are of the tapered or stepped type.

Large Machine Described

A recent installation for honing large caliber gun casings is shown in Fig. 7. The machine has a 32-ft. stroke. In this particular installation, the customer desired to rotate the work during the honing period, and this is accomplished by the power driven hydraulic chuck located at the extreme right end of the outboard bed. The chuck has adjustable jaws for holding various diameters of cylinder forgings, such as gun barrels. The 6-jaw adjustable steady rests, which are shown here, are designed for holding various diameters from 6 in. and upward to eliminate distortion in work of long lengths.

For long bores, it is frequently desirable that remote control of these finishing tools be provided. This is particularly advantageous in smaller diameter bores where smaller sized stones must be used because of construction limitations, and adjustment for stone wear must be made at more frequent intervals than with larger stones. Two types of control for adjustment are employed: The brake control, mechanically actuated type in which expansion pressure by manual operation is dependent on the skill of the operator; and the automatic, hydraulically actuated type. The latter is designed for use on a machine which can be set to maintain a constant working pressure, or will automatically increase or decrease the working pressure in a stepped time cycle or number of strokes. This type of tool can be conveniently used for multi-spindle operation in suitable horizontal honing machines, if so desired. This type of construction also facilitates the machining of remotely located constrictions in the bore.

(TO BE CONCLUDED)

Standards Proposed for Welding Fittings

TENTATIVE draft of a proposed American Standard for Welding Fittings is now available for criticism and comment. This proposal covers the over-all dimensions of fittings as designed for butt-welded joints, such as elbows and tees, caps and lap-joint stud ends, reducers and return bends. It covers also the pressure ratings, size, marking, material, metal thickness, tolerance and welding bevel.

The standardization of welding fittings is a part of the project assigned to the Sectional Committee on the Standardization of Pipe Flanges and Fittings, organized under the procedure of the American Standards Association in 1921 with the Heating, Piping and Air Conditioning Contractors National Association, the Manufacturers Standardization Society of the Valve and Fittings Industry, and the A.S.M.E., as joint sponsors. Copies of the proposed Standard may be obtained from C. B. Le Page, assistant secretary, American Society of Mechanical Engineers, 29 West 39th Street, New York.

Armco Accidents Reduced 54 Per Cent

A 54 per cent reduction in accidents last year among the employees of all plants of the American Rolling Mill Co. was announced by C. H. Murray, assistant to president. "The records for 1938 show a marked decrease in accidents in every plant," Mr. Murray said. "Our Zanesville, Ohio, plant went through the year without a single accident. Though the public thinks of a steel plant as a very dangerous place, we have evidence to prove that our men are safer at work than they are on the streets and in their homes."

Finishing Diesel Engine Crankshafts

By D. R. JAMES
Cleveland Editor

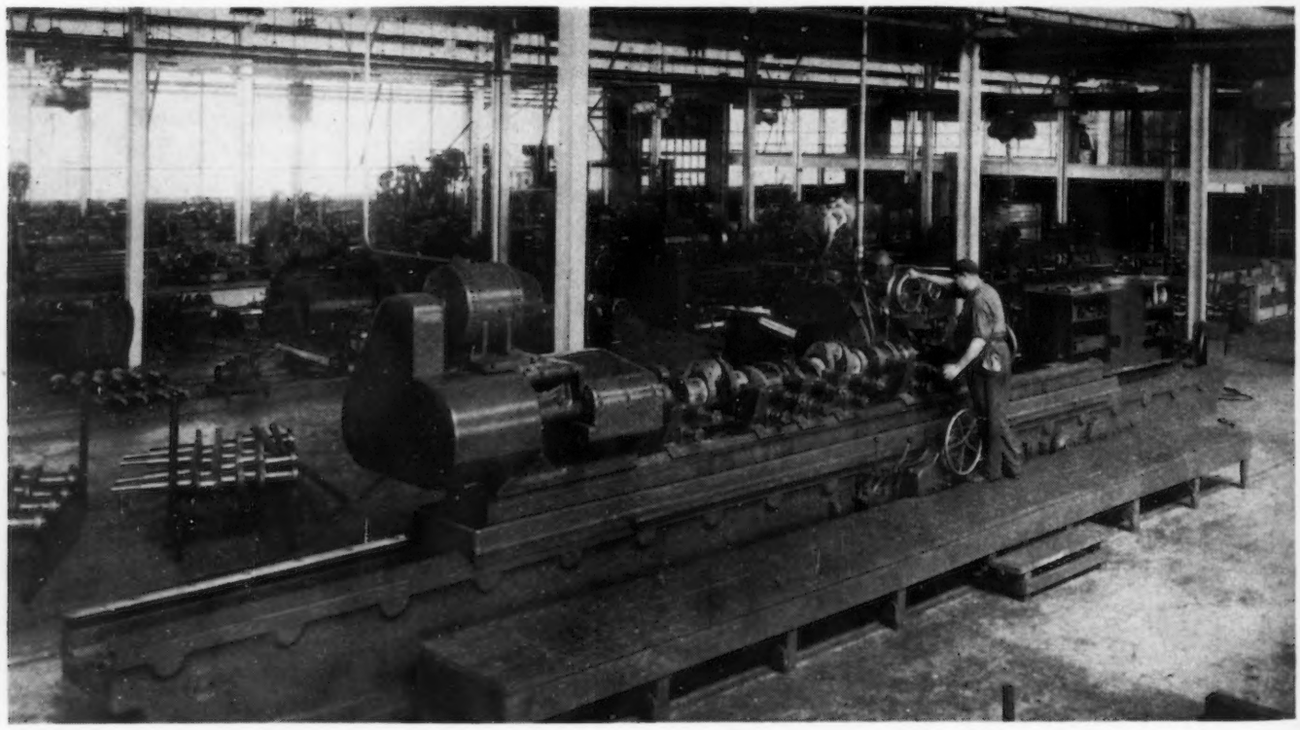
IN a large new plant at Cleveland where Ohio Crankshaft Co. machines, hardens and finishes a wide range of crankshafts from the heavy Diesel type down to the light automotive sizes, steps have been taken to facilitate processing through installation of late model equipment, and by overhead handling of materials over the entire area of parallel production lines.

This building, which is 550 ft. long, and consists of five wide bays, eventually will be enlarged by five more bays and devoted to the company's entire crankshaft production.

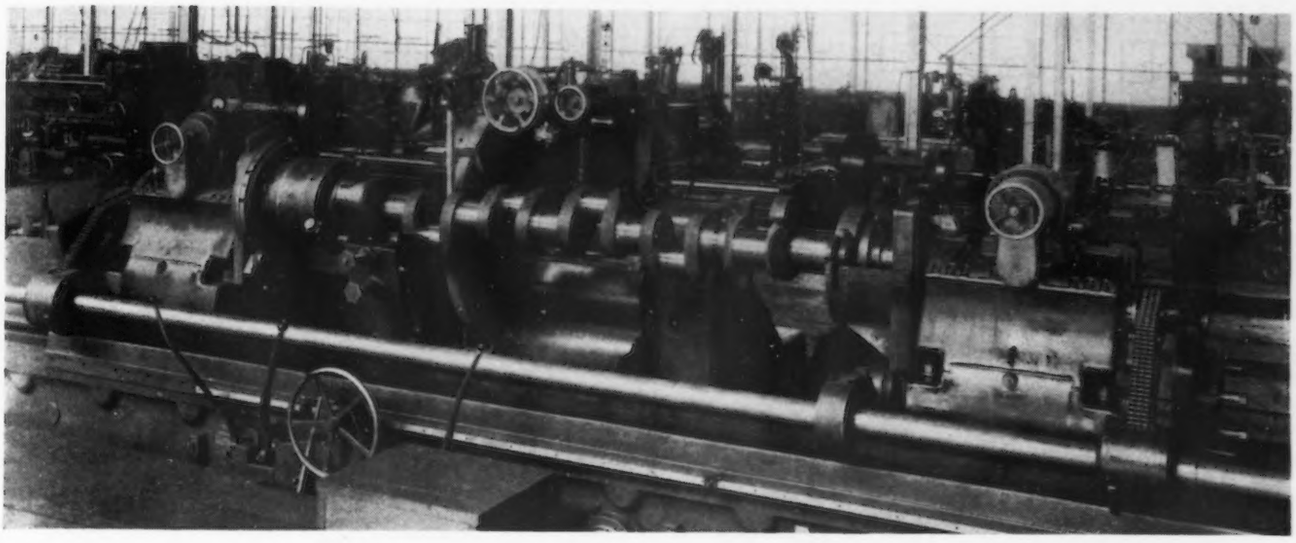
Two production lines are devoted to processing light crankshafts, one line to intermediate sizes, and a fourth line to the larger crankshafts. Considerable interest centers upon the processing of the latter, weighing up to two tons.

After receipt from the forge shop, the larger crankshafts are placed in a new Wickes Brothers 60-in. x 30-ft. single end drive universal type lathe arranged for machining the center bearings, one at a time, and both ends of the crankshaft. A back roller rest supports the bearing during the operation. The four-way turret on this machine is mounted on the front cross slide and arranged with tooling suitable for the various turning, cheeking and filleting operations.

Intermediate main line bearings are machined next. The lathe for the second operation is a Wickes 60-in. x



LINE bearings are rough ground on this 28-in. x 192-in. machine. For most of the line bearing grinding operations a 42-in. x 3½-in., x 12-in. wheel is utilized. At present, finish grinding of line bearings is also being done on this machine.



CRANK pin grinder, employing what is believed to be one of the largest grinding wheels used anywhere in connection with precision grinding operations. It is 54-in. x 3-in. x 12-in.

30-ft. double end drive lathe. This machine is provided with two carriages and each carriage is provided with front and rear tools which are fed into the center simultaneously. Both first and second operation lathes are driven by direct current. Automatic rheostats gradually increase the speed of the shafts as the tools work down to the smaller diameters. The two lathes were designed for machining crankshafts having bearings up to maximum diameter of 12 in. and maximum over all length of 18 ft.

The next operation is the rough grinding of the line bearings, on a 28-in. x 192-in. type B plain hydraulic Landis, standard in every respect. For most of the line bearing grinding operations a 42-in. x 3½-in. x 12-in. wheel is utilized. Next the crankshaft goes to the pin lathe, a 48-in. Wickes universal type lathe, with stroke setting and indexing type of pot chucks and movable tailstock on the bed for accommodating cranks of different lengths. This lathe has a back roller rest, and a three-way turret in front. The lathes are all arranged for power cross feed and power longitudinal feed as well as rapid traverse in all directions.

The fifth operation upon the large size crankshafts is the rough grinding of the pins upon a Landis 28-in. x 192-in. type B hydraulic raised to swing 44 in. and equipped with special crank heads. Both left hand and right hand crank carrying fixtures are mounted on slides, which makes it possible to grind shafts with a wide range of throws simply by shifting the position of the fixtures. The grinding wheel is believed one of the largest used anywhere. It is 54 in. x 3 in. x 12 in., the 12-in. hole enabling the user to transfer the wheel to a smaller machine after it has been worn down.

Drilling of the angle holes in a Leland-Gifford automatic hydraulic head, with step feed, is the next operation, after which the crankshaft is induction hardened by the Tocco process. Whereas the smaller crankshafts are placed in cabinets, in upright position, this is impossible for the larger shafts because of their size. They are placed in a "tunnel line" in longitudinal position. The induction block is clamped onto each bearing in turn. Often there are 13 large surfaces to harden, seven line bearings and six pin bearings.

An oil drawing to 450 degrees fol-

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CLOSE-UP view of first operation line lathe, which machines the center bearings one at a time, and both ends of the crankshaft.

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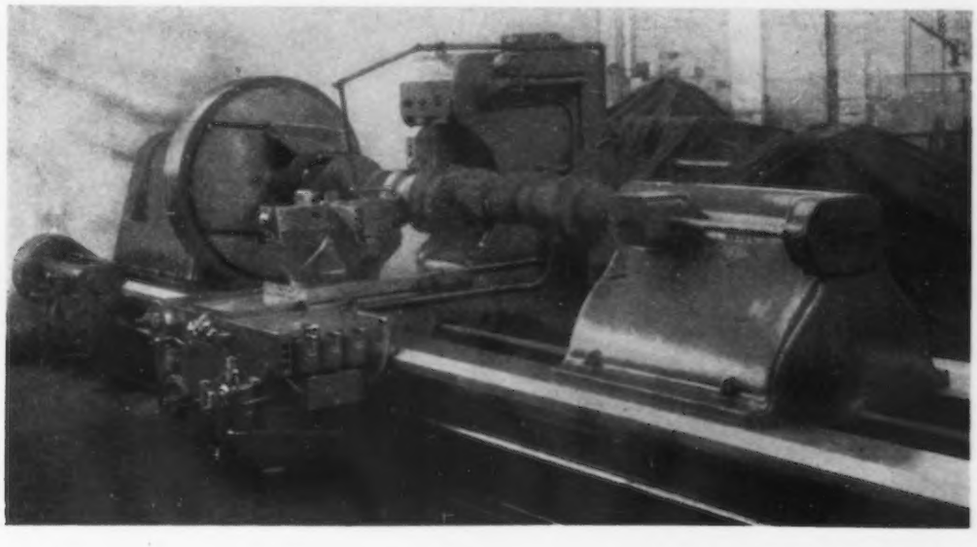
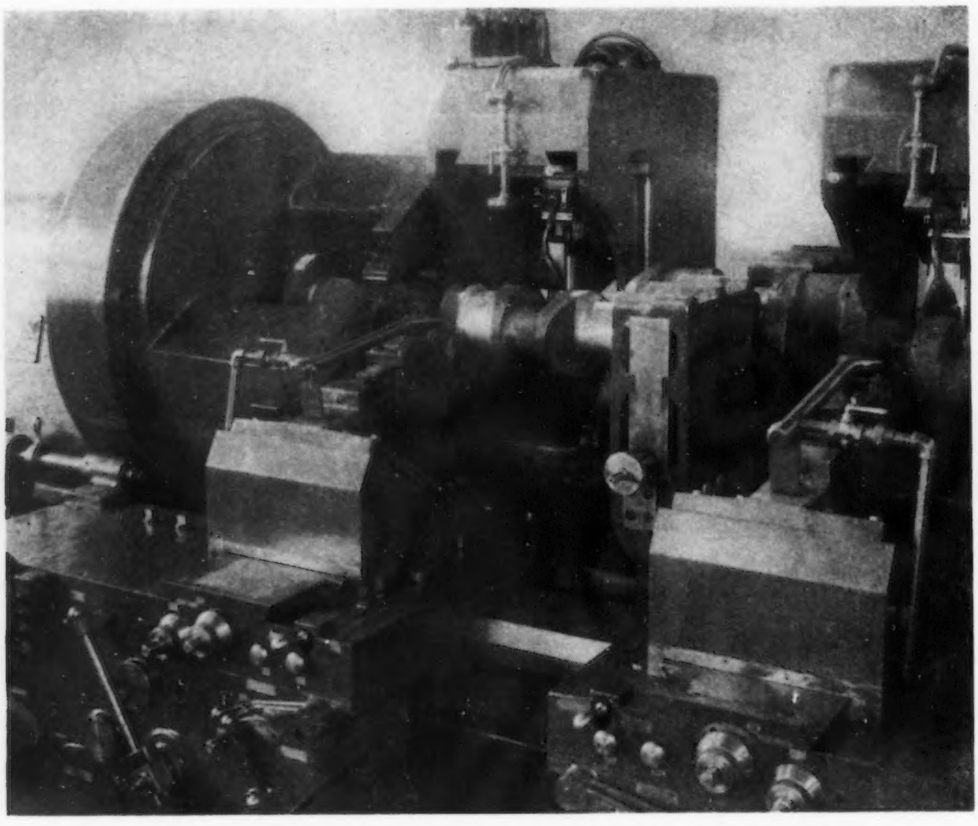
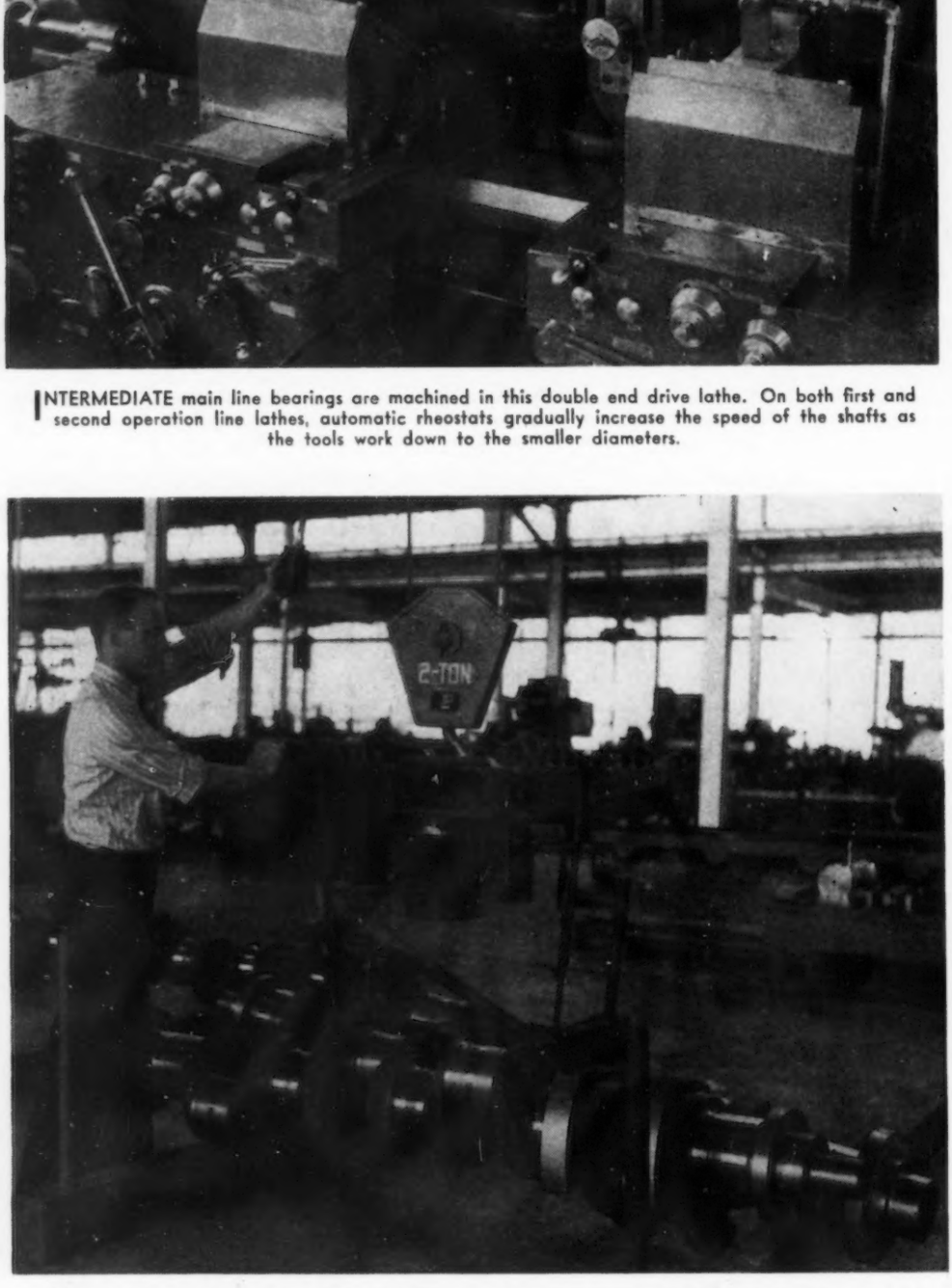




INTERMEDIATE main line bearings are machined in this double end drive lathe. On both first and second operation line lathes, automatic rheostats gradually increase the speed of the shafts as the tools work down to the smaller diameters.



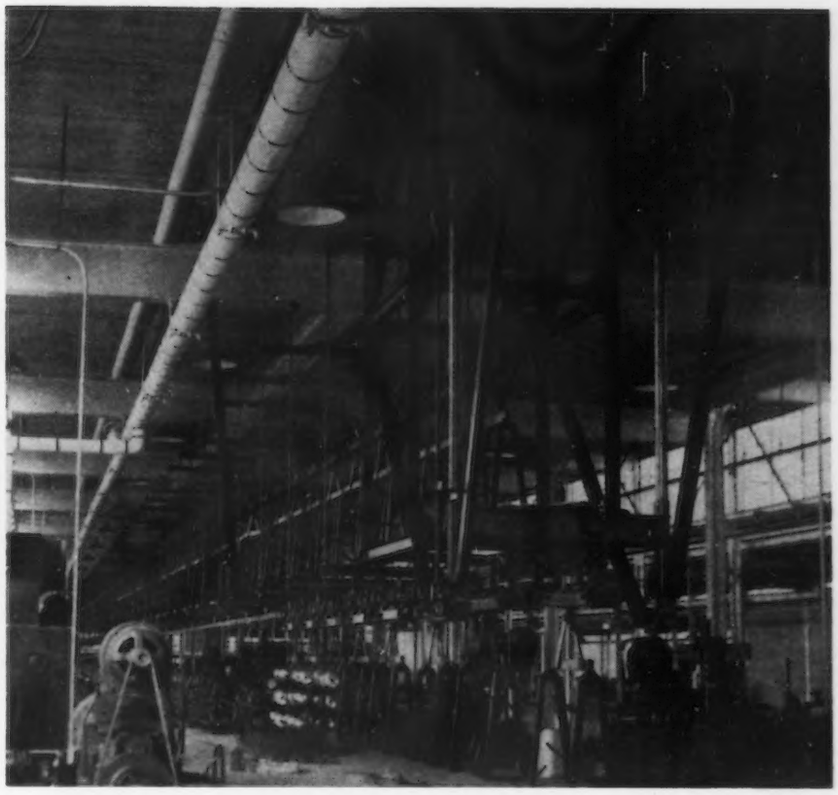
TO facilitate inching downward with the load the 2-ton cranes are provided with a hydraulic jack, as shown in this photo.

lows the hardening, and the ninth operation is magnafluxing for possible flaws. Then follows the finish grind on the line bearings and pins. The finish operation on the flange and front end of the crankshaft is done on a new Monarch heavy duty, long bed engine lathe 30 in. x 140 in., raised to swing 30½ in. over the compound rest. Finish drilling of the flange is accomplished on a new Rockford horizontal hydraulic drilling machine. This is a single spindle machine. The spindle is adjustable up and down through means of a hand wheel on top of the head and is driven from the variable speed motor mounted on top of the head. It is movable from front to back of the table by moving the entire column by means of a hand wheel. The table is fed from slow feed to rapid traverse by means of a hydraulic pump and cylinder, the feeding functions being controlled manually by levers at the front of the base of the machine. The hydraulic pump is driven from a separate motor.

The cutting of the keyways is done on a Cincinnati hydraulic milling machine. This is a standard hydromatic, but Ohio Crankshaft Co. adapted to the horizontal carrier a cylinder, thus providing vertical feed on the horizontal carrier actuated by the table feed hydraulic circuit.

Then follows the balancing operation and the polishing of the completed crankshaft. The larger crankshafts are balanced within one inch, ounce and the smaller shafts 3/10 of one inch, ounce.

Operations frequently vary from the above given outline, depending on the number of keyways and the number of flange holes.



THE new plant is completely serviced by overhead handling. As shown in this photo, the smaller size crankshafts are loaded at man height upon push racks which move along a monorail. Each push rack carries six of the crankshafts, three on a side, in vertical position.

o o o

The 500-ft. runways in the plant are completely serviced by the overhead handling system installed by American MonoRail Co.

The smaller size crankshafts are loaded at man height upon push racks which move along a monorail. Each push rack carries six of the crankshafts, three on a side in vertical position. After going down the production line, the carrier units are raised to an upper level which is on a gravity slope, facilitating their return.

Workmen on each side of the monorail have easy access to the crankshafts on the push racks.

The two center runways of the long plant are serviced by four one-ton cranes, two in each runway, facilitating the transfer of materials from one line to the other.

Two two-ton cranes are operated in the next production line, and two more cranes handle the largest size crankshafts in the fourth line.

A hydraulic jack is provided for the large cranes, to facilitate inching downward with the load.

Demonstrates Built-Up Edge on Cutting Tools

FURTHER visual evidence to support the theory of the built-up edge in the action of cutting tools is given by some high-speed motion pictures taken in the laboratory of the Jones & Laughlin Steel Corp. The pictures were shown on Jan. 5 before the Machine Shop Practice Division of the A.S.M.E. in New York by Y. J. Bruce, metallurgical engineer of the steel company. The pictures taken with a Bell Telephone Laboratory camera at a speed of 800 frames per sec. clearly showed how the metal being cut built up a triangular-shaped wedge on the point of the cutting tool so as to fill out the "natural" cutting tool angle for optimum cutting. This built-up edge broke down and reformed many times a second in the cutting of bessemer screw stock.

Mr. Bruce summarized in a paper the work on the machinability of metals being done under the direction of Dr. H. K. Work, director of research and development of J. & L. Cutting forces measured with a Schiess Defries dynamometer clearly indicated that cold-drawn bessemer screw stock with a brinell hardness of 187 machines freer than hot-rolled material of only 140 brinell. Tests made in a four-spindle automatic, cutting dry, indicated that the longitudinal or feed cutting force drops off for the first 10 min. and then maintains a constant level which is held until ultimate tool failure. Due to variations in the machine drive and in the material itself, graphic force charts are quite irregular, but show definite repeated characteristics for each heat of steel. A surprising result is that different heats of bessemer screw stock of the same chemical analysis show cutting forces varying over a wide range.

The work being done by Dr. Work is not yet complete, but has progressed far enough to indicate the development of a technique for the rapid determination of the machinability of bar stock.

Pittsburgh Hospital to Have Stainless Operating Room

PITTSBURGH—According to the health director, I. H. Alexander, Pittsburgh is soon to have the first stainless steel finished hospital operating rooms in the country. Stainless steel is to be used wherever desired, instead of tiles, in operating and related rooms.

Precision Machining of Gisholt Beds—

o o o

THE present high speed age is continually demanding more and more of the machine tool builder. More power, more speed, more accuracy. Such demands are reflected in shop practice in the form of improved methods of machining involved in producing our master tools. The accompanying pictures and captions show operations now being carried out by the Gisholt Machine Co. in connection with machining the bed and headstock castings of the Gisholt turret lathes.

o o o

AT LEFT

AFTER being rough ground and painted with an under coat, the one-piece bed and headstock castings are rough planed, leaving 1/16 in. of stock for semi-finish and finish operations. After the ways, auxiliary ways, bed slot and headstock top are planed, the alloy iron casting is turned over and the bolt pads planed.

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o o o

AT RIGHT

NEXT major operation is boring the spindle bearing holes and the bearing holes for the headstock shafts. This is done on an openside boring mill, the work being mounted on a jig upon a revolving table. Bearing holes are held to a limit of five ten thousandths.

o o o

Pictorial Sidelights on Modern Machine Tool Making

BELOW

AFTER the hardened high carbon chrome nickel molybdenum ways have been separately finish ground and seasoned they are bolted to the bed and finish ground to within 0.0001 in. alinement of the spindle. The operation, shown below, is performed on a table type grinder.

ABOVE

BY means of an ingenious fixture which provides both location and feeding device, an air drill is enabled to drill the spindle bearing oil holes.

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o o o

AT LEFT

THE bed is now ready for the final operation in which various bolt holes are drilled and tapped. After a coat of grease is applied to the ways and the rack, the bed is ready for assembly.

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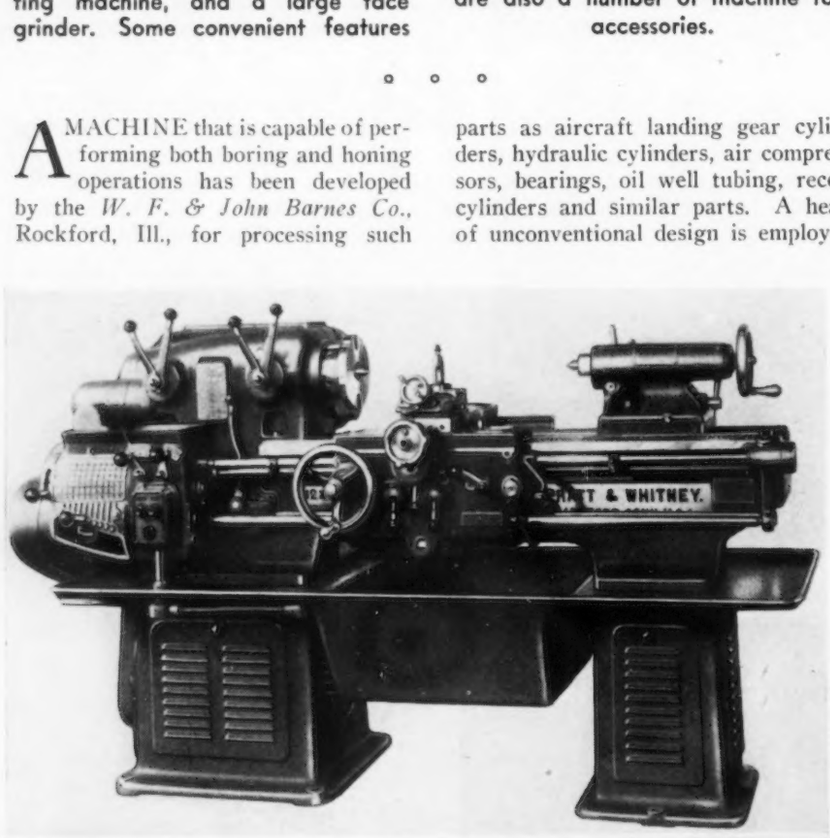
Design Improvements Continue

FOR the first time a machine has been offered that will both bore and hone long work with the same head. Among other machines recently announced by the machine tool builders are an improved precision lathe, and improvements in a pivot burnishing machine, an abrasive cutting machine, and a large face grinder. Some convenient features have been incorporated in a constant peripheral speed snagging grinder. A universal duplicating attachment for lathes, milling machines, planers and shapers is illustrated, and a special machine for finishing valve bodies is described. Included in this review are also a number of machine tool accessories.

o o o

A MACHINE that is capable of performing both boring and honing operations has been developed by the *W. F. & John Barnes Co.*, Rockford, Ill., for processing such parts as aircraft landing gear cylinders, hydraulic cylinders, air compressors, bearings, oil well tubing, recoil cylinders and similar parts. A head of unconventional design is employed to combine these diverse machining methods. In order to reduce the amount of friction on the horizontal way surface to a minimum, with hone reciprocating feed rates, the head is carried on three pair of preloaded ball bearings on each side. These rollers bear on a hardened and ground way of deep section and have eccentric mounting of the stud shafts for facilitating alinement. Head housing is of aluminum alloy.

The head is designed to use Micromatic hydraulically controlled hones. All gears in the head are hardened and are carried on spline shafts mounted in anti-friction bearings.



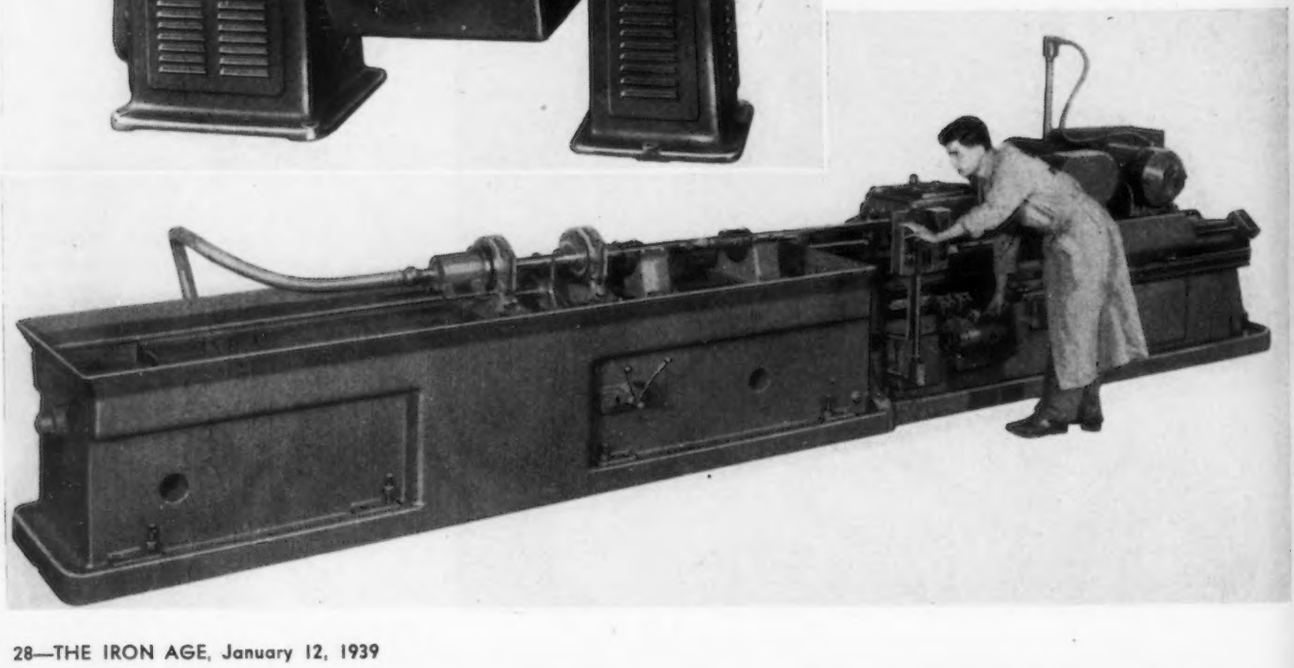
AT LEFT

A NUMBER of new features have been incorporated in the new 12-in. P & W model C lathe, a companion machine to the 14 and 16-in. model C sizes. Spindle speeds range up to 1500 r.p.m.

o o o

BELOW

COMBINATION boring and honing operations can be performed on a large range of cylinder and sleeve sizes in this hydraulically actuated machine just announced by W. F. & John Barnes Co.



in Machine Tools

By FRANK J. OLIVER
Associate Editor, The Iron Age

Spindle drive is by worm and wheel connected to the V-belt motor drive through pick-off speed change gears. A plugging switch is incorporated in the motor control to stop the spindle the moment the hone is withdrawn from the bore. Spindle speeds range from 66 to 600 r.p.m.

The wide combination of head feeds required for both boring and honing is obtained by a Barnes hydraulic unit. Fine and positive adjustment of this unit is said to permit accurate control of stroke without application of positive stops. In general practice, the head reciprocation can be set to reverse within 0.002 in., facilitating honing of dead-end bores and shoulder work. Jogging of the honing stroke can also be easily accomplished at any point within a predetermined stroke for removal of taper and the time of dwell may also be regulated. Boring feeds vary from about 0.062 to 12 in. per min.; hone strokes, from 35 to 60 ft. per min.

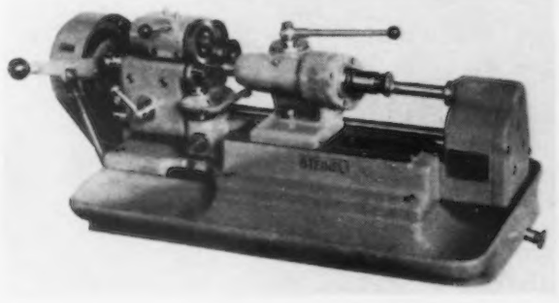
After the machine is set up for boring or honing, it is completely controlled by push buttons and levers located at a central position. Adjustable trip stops are furnished for blind-end boring. Honing cycles can be manually controlled or automatically controlled by trip dogs. Interchangeable fixtures for handling a wide range of cylinders can be furnished with this machine for either boring or honing. Standard fixture housings for either use can also be supplied.

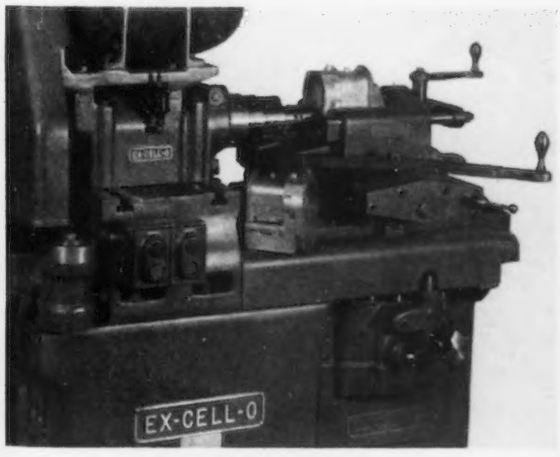
12-In. Precision Lathe

SUPPLEMENTING the 14 and 16-in. sizes of its model C lathe, *Pratt & Whitney, Division Niles-Bement-Pond Co.*, Hartford, has brought out a 12-in. size in two bed lengths, having center-to-center capacity of 30 and 54 in. The new lathe has 18 spindle speeds arranged in geometric progression up to 1500 r.p.m. Drive is by three V-belts from a 3-hp., 1800 r.p.m. motor mounted in the cabinet leg under the tailstock. All headstock spindle gears are hardened and ground and are of the spur type, except for a pair of helical gears connecting drive shaft to headstock. Gear shafts are mounted on ball bearings, and the spindle is mounted on a pair of widely separated preloaded ball bearings at the front end and a roller

AT RIGHT

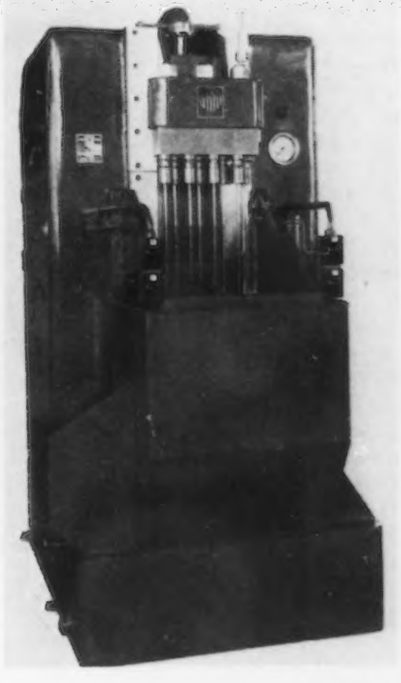
THE Steinel pivot burnishing machine is designed to burnish shafts and pivots of small pinions to form bearing surfaces of a high degree of precision and finish.





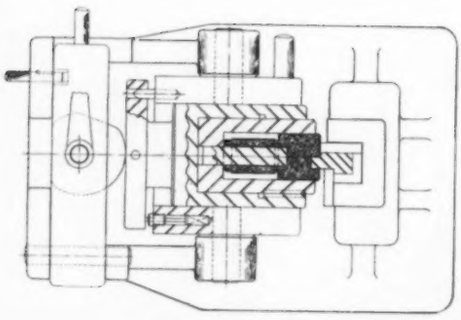
ABOVE

IN this special two-spindle Ex-Cell-O precision boring machine, aluminum, cast iron and steel are machined in succession on a magneto housing. At the first station, three diameters of the aluminum case are bored and the end faced. Spindle speed is 2000 r.p.m. and feed, 0.0015 in. per rev. The fixture and piece is then indexed by hand lever to the second station at the rear, where cast iron and steel inserts are finished bored with carbide tools, using a spindle speed of 625 r.p.m. and feed of 0.015 in. A finished case is produced every 2 min.



AT LEFT

THE improved type VP "American" hydraulic broaching machines of the vertical pull-up style are much more rigidly constructed, said to give a smoother, positive cutting action with consequent longer tool life and finer hole finishes.



ABOVE

SPECIAL indexing fixture designed by Colonial Broach Co. for cutting three slots between jaws of a flexible coupling. Three passes of the broach are required, with indexing after each cycle of the broach. Fixture is pivoted two ways, and to load the part, the fixture is swung back and the part pushed on a locating mandrel and bushing. Locking of this bushing is by a hand-operated cam. Index locating is by means of the pin shown at the extreme left. Production is 50 to 60 pieces per hr.

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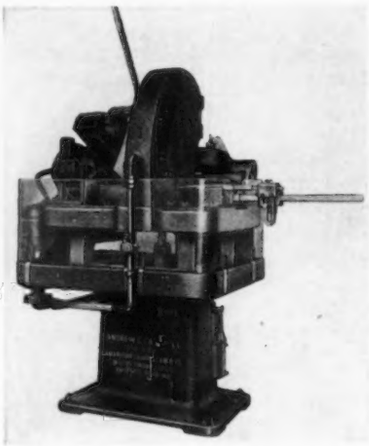
BELOW

THE improved Campbell No. 213 abrasive cutting machine has a capacity for tubing up to 3½ in. diameter and solids up to 2 in.



bearing at the rear. A Cam-Lock spindle nose is used.

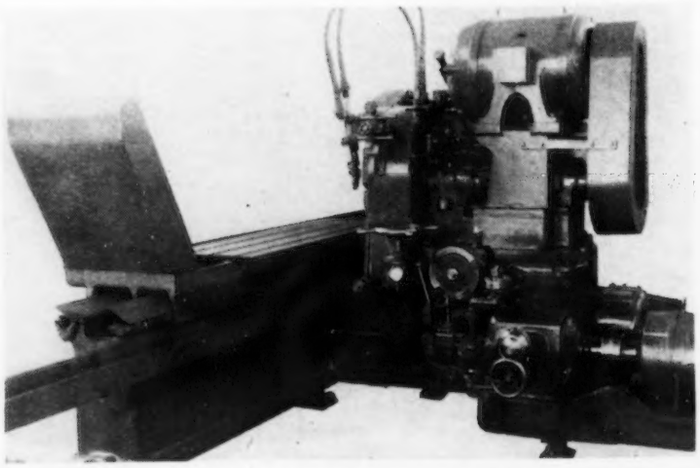
The rear of the headstock and bed are built out to give solid support to the driving pulley, doing away with excessive overhang and giving a larger surface area for the oil reservoir in the bed. Oil is pumped over the gear train and is cleaned by a Cuno filter before being re-used.

The quick change gear box provides 60 changes of feed, ranging from 0.0025 to 0.152 in. or from 1 to 60 threads per in., and a direct reading index plate permits rapid setting and checking. A quadrant and change gear arrangement is also provided for special threads or for translating. As in other P & W models, a separate feed rod and lead screw are employed, and a synchronizing high speed clutch mechanism has been incorporated in the head stock for reversing the carriage at high speeds without stopping.

The apron is fully accessible from the front. All gears and worms are mounted on ball bearings. Feed clutches are of the positive type. The cross slide screw is supported in a ball thrust bearing for easy hand action feel. The oiling of the carriage, apron and cross slide is accomplished automatically by a small pump operated by the action of the clutch lever, giving the effect of a one-shot system. Oil is stored in a reservoir in the apron and is pumped to a pocket running the full length of the top of the apron, through which it is distributed by various metered outlets.

Hydraulic Broaching Machines

AN improved line of vertical pull-up internal broaching machines of the hydraulic type is announced by the *American Broach & Machine Co.*, Ann Arbor, Mich. These machines are built in several sizes and from 10 to 20-ton normal capacity. As in other "American" machines, the piston rod is the fixed member and the cylinder and integral square lock slide ways carries the broach pulling lug. Stuffing box is on the low pressure side, and the high pressure is held by two cast iron piston rings and a cup leather ring on the piston head. A Sundstrand variable-delivery pump, driven by V-belt, is used for operating the broaching cylinder, while a small constant-delivery pump supplies power for operating the broach elevating cylinder for leading the tools through the work.



CONTROLS have all been centralized so that the operator can stand at the right-hand side in the back of the improved type 75 segmental-wheel face grinder, made by the Bridgeport (Conn.) Safety Emery Wheel Co., Inc. The tripper dogs controlling the length of carriage travel and reversal have been removed from the front of the machine and placed on a dial at the operator's position. Speed control is through a handwheel on the new style Oilgear pump shown to the right of the dial. As in previous models, spindle is Timken equipped, and table ways have forced feed lubrication.

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AT RIGHT

SMALLEST tool post grinder to be offered by the Dumore Co., Racine, Wis., is the Tom Thumb, with 1/14-hp. plain series universal motor and ball bearing spindle for small lathe work. Spindle speeds range from 8500 to 19,000 r.p.m. to handle wheels from 2 down to ⅛ in. Wick type lubrication is used for both spindle and motor bearings. Net weight 6¼ lb.

Hydraulic valves that control the machine cycle are solenoid operated, and control of the stroke of the broach elevating and broach pulling cylinders is by limit switches. Cycle starting and inching are by push button. Standard operation of the machine is semi-automatic, but fully automatic cycles are possible.

Advantages of the vertical pull-up type of machine are that the loading height is much lower than in a pull-down machine and the pulling-up action permits the broach to follow the hole without any interference. At the end of the broaching stroke, a work deflector plate swings up automatically and lets the work drop to the front of the machine. This insures a clear path for the return of the broaches as the plate protects the guide bushings whenever the broach is completely through the work. Upon completion of the downward movement of the broaches, this plate moves back out of the way. The broaches are released when the pulling cylinder reaches its lowest position and they are then lowered automatically by means of the elevator cylinder.

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AT RIGHT

THE type D Ransom machine is a constant peripheral speed grinder, giving 6400 ft. per min. for 24-in. wheels and especially designed for snagging work in the foundry.

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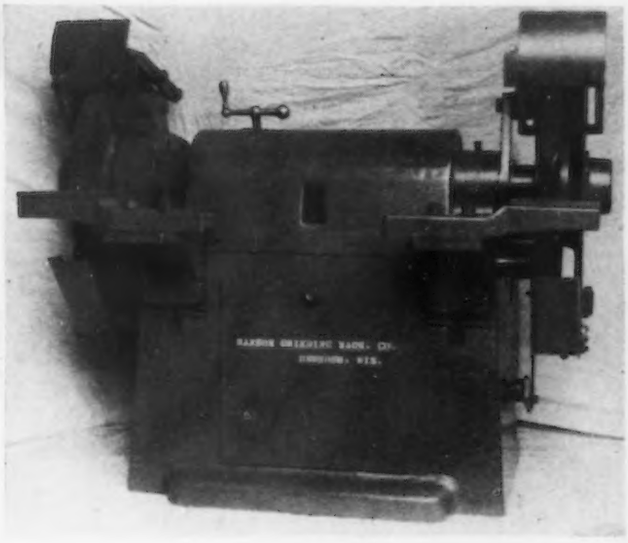

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AT LEFT

PONTIAC'S production department designed a special head for a Cincinnati miller to machine an angular face on the manifold after a pad parallel to the axis of the part is milled by the regular side head. Combining these operations eliminates the possibility of error in the angular relationship of the two machined faces.

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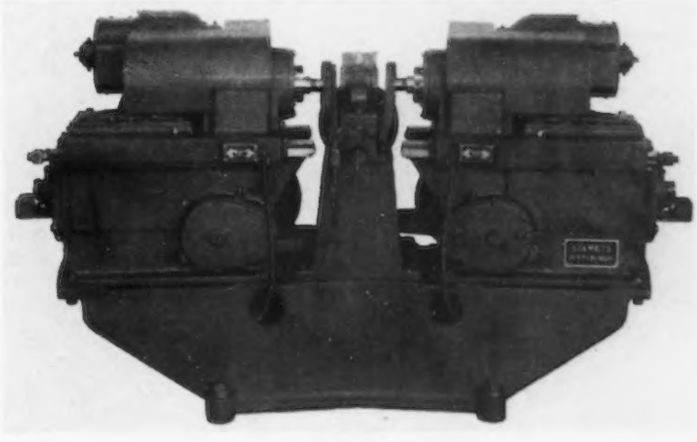


ABOVE

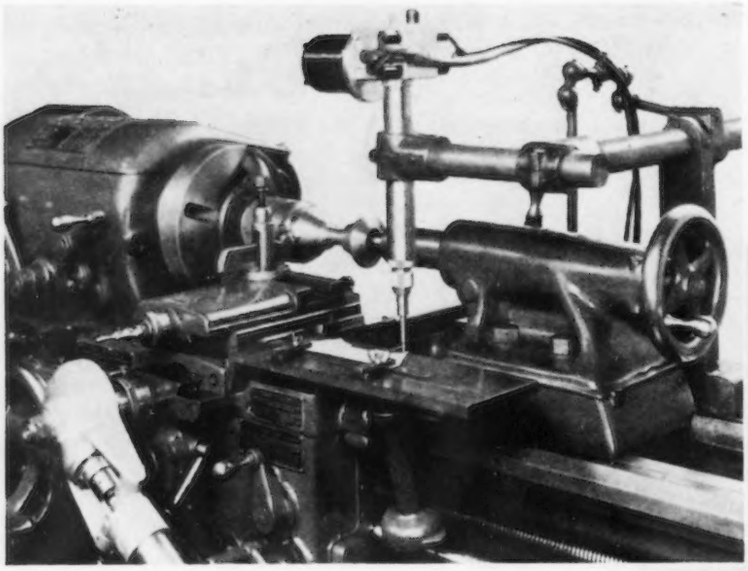
THIS special double-end facing machine was developed by William K. Stamets, Pittsburgh, for boring the water way and facing the seats in valve bodies and for facing disks. The two boring heads swivel about the center of the machine so that they can be set at an angle to each other, if desired. Each boring spindle carries an arbor and tool holder so disposed as to provide a compound eccentric for radial adjustment of the tool tip, at the same time giving balance necessary for high speed operation with T-C tools. Mounted on each carriage is a slide that carries a nut engaging the rear threaded portion of the arbor, so that when the slide is moved it rotates the arbor, providing cross feed for the cutting tool. Both the carriage and the carriage slide are actuated by drum cams.

Pivot Burnisher

A NUMBER of improvements have been made in the Steinel pivot burnishing machine, being marketed in the United States by *George Scherr Co., Inc.*, 128 Lafayette Street, New York. The lever for feeding the work is now a rack and pinion type instead of a yoke; the burnishing wheel bearing is longer; the foot treadle is now at the head instead of the tail end of the machine; and the belt and pulley are better guarded. The machine may now be used with tungsten-carbide wheels, giving much longer life. The broach rest is adjustable in height for various shaft diameters and also to overcome taper, if present. It has micrometer adjustment for control of diameter. This machine will finish to a tolerance of 0.0004 in. bearings, pivots and other articles produced on automatics.

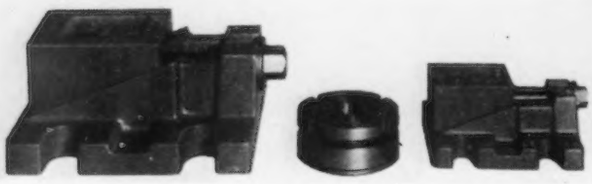
Abrasive Cutting Machine

MORE accurate cuts are claimed for the improved Campbell No. 213 abrasive cutting machine by rea-



ABOVE

A COMBINATION hydraulic and electric control duplicator attachment has been developed by Reed-Prentice Corp. for use on toolroom engine lathes for face and circular form work, on vertical milling machines and horizontal boring mills for die work and on planers and shapers for form planing and shaping of molds and dies. As applied to a standard lathe, the template following mechanism may be mounted as shown and the hydraulic motor drive applied either to the cross-feed screw or to the apron lead screw.



ABOVE

THREE new type of alining and leveling jacks for machine tools have been announced by Baker Brothers, Inc., Toledo. No. 43 jack, left, is for large planers, boring mills, and the like. With a base 9 x 8 in., it has an adjustment range of 4¼ to 5 in. No. 42, right, is a similar type but smaller, with an adjustment range from 2¾ to 3¼ in. by the angle slide screw. No. 41 jack, center, is a screw type, 4 in. in diameter, for use with lathes, milling machines and similar equipment. Its maximum height is 2¼ in. and the range is 1⅝ in.

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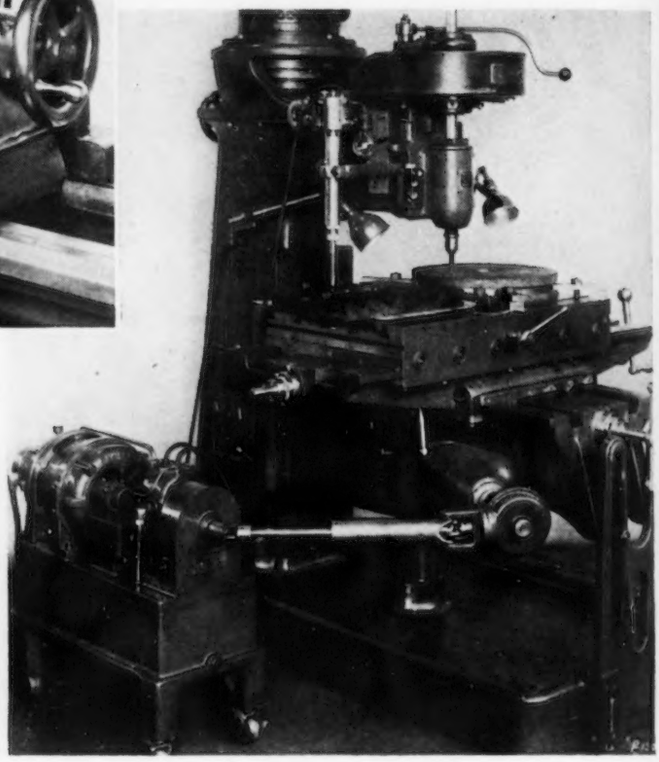
BELOW

APPLICATION of the Reed-Prentice duplicator to a vertical milling machine. The attachment can also be used for three dimensional die sinking by having a small hydraulic motor connected to the longitudinal, cross and vertical feeds, using one pump and electric control unit for the three movements.



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son of a foolproof coolant system that distributes fluid equally to each side of the abrasive wheel. Coolant box side walls are movable and can be pushed out of line without damaging them. Pieces of a broken wheel drop completely through the distributor into the main coolant pan. There is a new micrometer stop bar which can be set to any length within plus or minus 0.02 in. at first setting. Holding pressure clamps, convenient coolant shutoff, reversible work holder liners and safer wheel guards are other improvements in this new model made by the *Andrew C. Campbell Division, American Chain & Cable Co., Inc.*, Bridgeport.

Snagging Grinder

A CONSTANT peripheral speed snagging grinder for heavy foundry work has been recently announced by the *Ransom Grinding Machine Co.*, Oshkosh, Wis. Drive of the spindle is by a 5 or 7½-hp. totally enclosed ball bearing motor mounted on the rear plate of the base and speed variations to compensate for wheel wear are made through an Allis-Chalmers speed changer unit employing varipitch sheaves. From this unit, power is transmitted by Texropes to a spindle sheave outside the left bearing. Hence to change belts, only one wheel has to be removed and the spindle does not have to be dismantled. Speed control is accomplished by means of a handwheel on top of the machine, the movement of which is interconnected mechanically with the wheel guards. When the guards are lowered to touch the lug on the spark arrestor, a peripheral speed of 6400 f.p.m. is attained. This adjustment allows a 24-in. wheel to be worn down to 13 in. diameter, and may be run down below this point, but without corresponding spindle speed adjustment.

Guards are made of plate steel throughout. They have hinged doors, nut covers and exhaust pipe connections so arranged that only the dust is exhausted, the heavier material dropping into the bottom of the guard,

HIGH pressure feed and low pressure rapid traverse movement are possible with the new Vickers double pump and combination valve, shown in a foot mounting.

where it can be easily removed. Motor has an across-the-line starter with overload and undervoltage protection, actuation being by push button.

Hydraulic Feed and Traverse Unit

VARIABLE volume control of hydraulic traverse and feed circuits is possible with a new double pump and combination valve unit, announced by *Vickers, Inc.*, Detroit. In a unit casing are two Vickers balanced vane pumps driven by a single shaft, with the output of the smaller pump available to the hydraulic working system under all circumstances and the other, larger pump cutting in automatically only when needed, such as for rapid traverse operation. Automaticity is effected through a pressure-actuated unloading valve. During traverse motions, the pressure in the working system is low, and the unloading valve causes the delivery of the larger pump to join that of the smaller. Whenever feeding action begins, pressure in the system is built up because of the introduction of a flow control valve into the active circuit. When this occurs, the pressure unloading valve is shifted, causing the output of the second pump to be discharged to the reservoir at no pressure. The unloading valve may be externally adjusted for any desired system pressure. An integral relief valve is also included in the combination pump unit and functions to control the maximum system pressure up to 1000 lb. per sq. in. Almost any practical combination of pump sizes are available.

Vickers is also offering a new hydraulic flow control valve that minimizes effect of pressure and temperature changes in the system. This valve is designed so that practically constant oil volume is metered through at any pressure up to 1000 lb., and shows only small variations in discharge for a given setting for a wide range of oil temperatures and viscosity changes. These valves are also said to be capable of handling as little as 5 cu. in. per min. with accuracy. They are available in a number of different sizes.

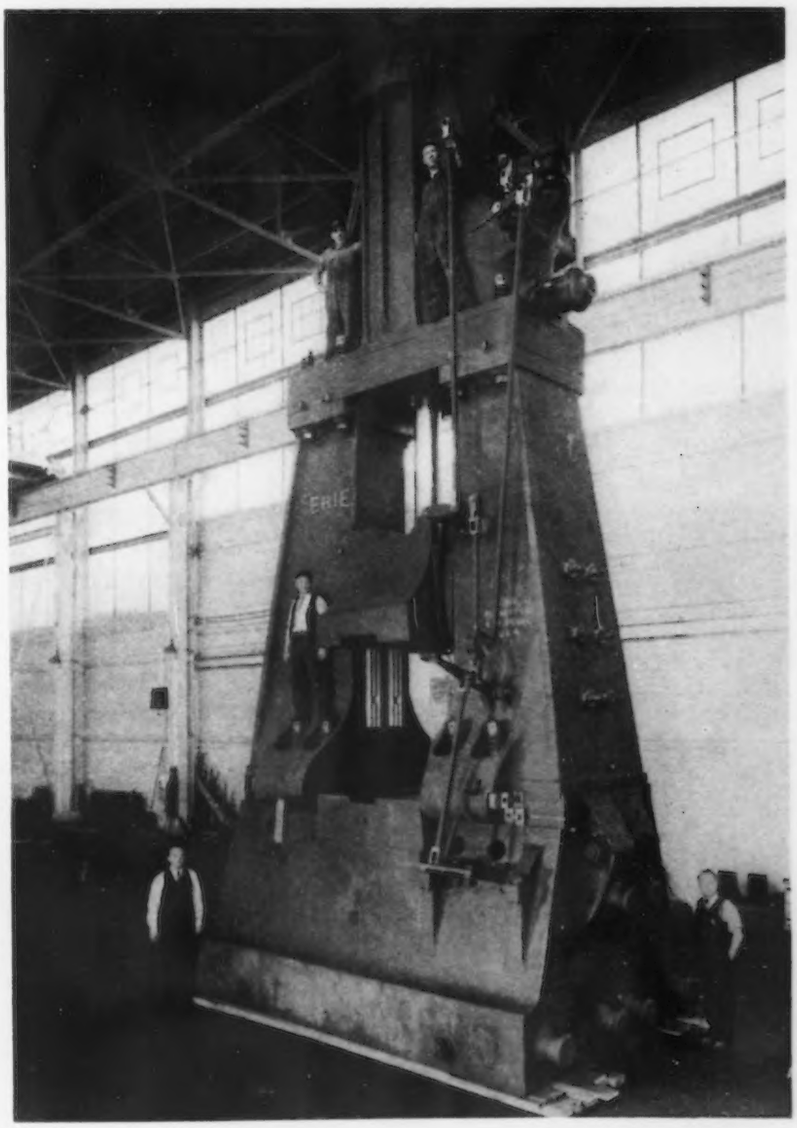
AT right is shown what is reported to be the world's largest steam hammer. It was built by the Erie Foundry Co., Erie, Pa., and is to be used in England for the forging of airplane propellers.

The hammer is 27 ft. in height from the floor line, higher than the average dwelling house.

Beneath the floor, extending 12 ft. 9½ in. into the ground and resting upon its own foundation anchored to bedrock, extends the sub-anvil structure. This is in two pieces, each of which weighs approximately 234,000 lb. The super-anvil, above the floor line supporting the gigantic frames, is in two pieces, each of which weighs approximately 200,000 lb.

The weight of the ram, piston rod, and piston is 50,000 lb. and with the top die included the reciprocating weight increases to more than 70,000 lb.

The diameter of the cylinder is 39 in. and the stroke of the piston is 72 in. The piston rod diameter is 11½ in. The space between the guides is 50 in. and the ram is 80 in. front to back.



On the Usefulness of Sky-Hooks

CHAPTER 34 of a Series on Materials Handling Methods and Equipment.

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By FRANCIS JURASCHEK
Consulting Editor, The Iron Age

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BETWEEN the load and the crane that moves it, lies an Achilles tendon—a spot of vulnerability. To this spot traces inevitably the usefulness or otherwise of all overhead handling mechanisms. All the versatility of your lifting-and-shifting equipment hinges finally on the ability of your sky-hook to pick up and hold the load. Let's look at an even dozen of sky-hooks and note how and why they work successfully.

Of sky-hooks the number is legion—but all of them may readily be reduced to a few simple classifications. Always there is the hoist-hook itself; a common denominator. Sometimes that is all that is needed to engage the load, as when the load itself is fitted with a ring, and eye, or a handle through which the hoist-hook can be engaged. But that is not a very common occurence, and to supplement the powers of the hoist-hook proper we find just six broad categories of auxiliary equipment, known to the man in the shop indiscriminately as "sky-hooks." A brief analysis of these six classes reveals the manner in which each is used.

1. Slings. These may be formed of a length of rope, a wire cable, or a chain. In the case of rope, both ends are usually finished off in spliced loops, so that the loop ends may be engaged in the hoist-hook to prevent any slipping of the load. In the case of wire cable or chain, the loops may be reinforced by metal fittings called "thimbles," or closed or open sockets may be attached permanently to the ends, or an endless, spliced section of

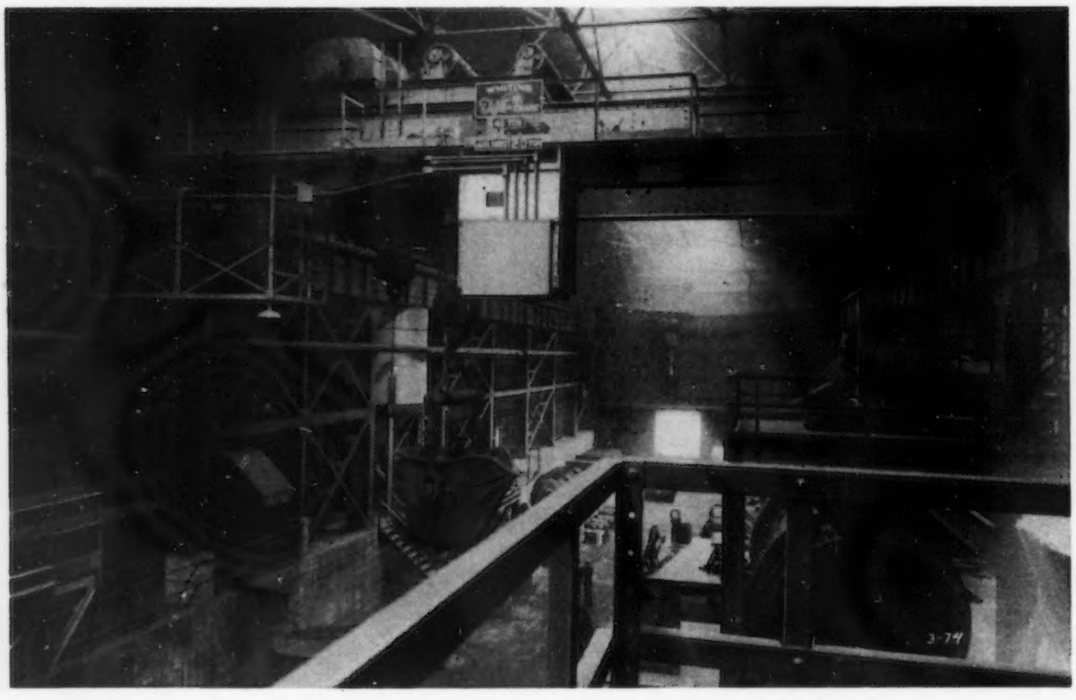

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FIG. 1—A hot-metal pouring ladle carried in a special expanding handle by a Whiting 45 ton, 60 ft. span crane.

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FIG. 2—A special bag - handling grab for stacking metal pallets of bagged material, working from a Northern 3 ton, 96½ ft. span crane.

cable may be used in a basket or an anchor hitch. Or a bridle sling may be formed by hitching the middle of the cable or chain over a metal bridle-piece which the hook engages, while each end of the cable or chain is finished either with a thimble-loop or a socket or a hook. An excellent illustrated brochure on all these matters was recently issued by Broderick & Bascomb Rope Co. under the title of the "Riggers' Hand Book." Slings are used for handling bulky packages or parts, such as boxes, barrels, bales, castings, forgings, machinery of all kinds, pipe or tubes, mandrels, rolls, bars and sheets.

2. Magnets. For the handling of ferrous materials, such as coils of strip steel, pigs of iron, slabs, wire, pipe and tubes, or scrap, powerful electro-magnets of circular or rectangular shape, capable of lifting up to 30,000 lb. or more at one time, are available from several manufacturers. These magnets pick up their loads automatically, and release them when a button is pushed to break the electrical circuit. They are fast, durable and safe in operation.

3. Grab Buckets. A large variety of grab buckets are available for use with overhead cranes, most of them known as "clam-shell" or "orange-peel" types. They are mostly used for the handling of bulk material such as sand, gravel, crushed stone or ore, ashes, coal or coke, limestone, etc. Sometimes they are used for handling small scrap, although here the magnet is rapidly replacing the grab bucket wherever electric power is available.

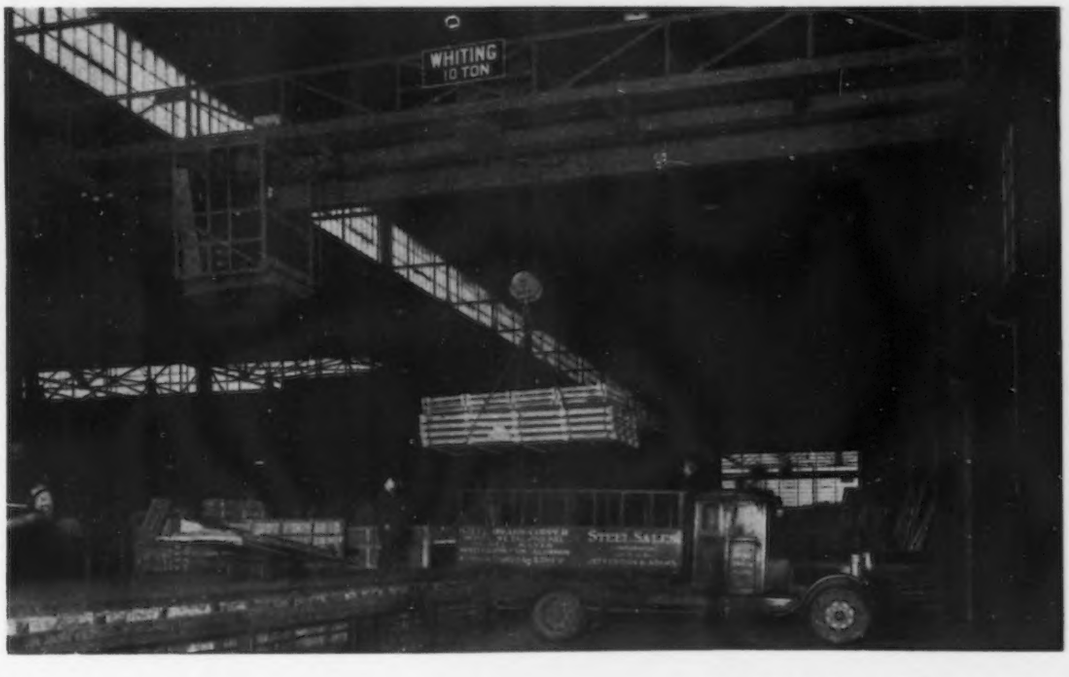
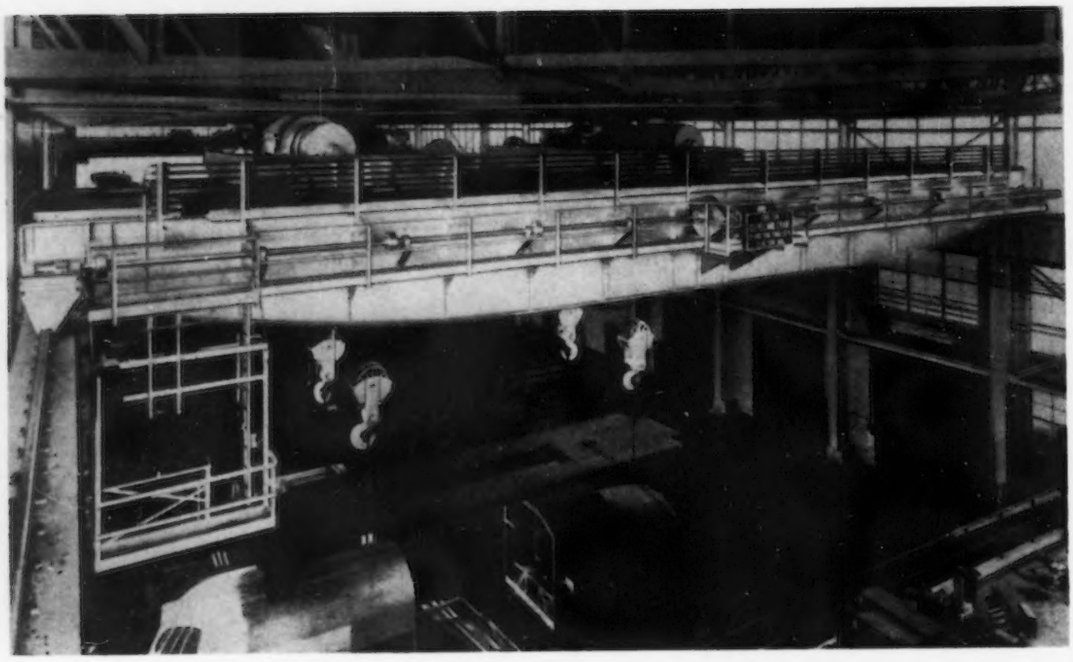


FIG. 3—A double chain - sling for handling boxed sheet metal, attached by a common link to a Whiting 10 ton, 46½ ft. span crane.



AT LEFT

FIG. 4—Handling a locomotive bed plate by two slings and four hooks, from a two trolley, 200 ton Cleveland crane.

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BELOW

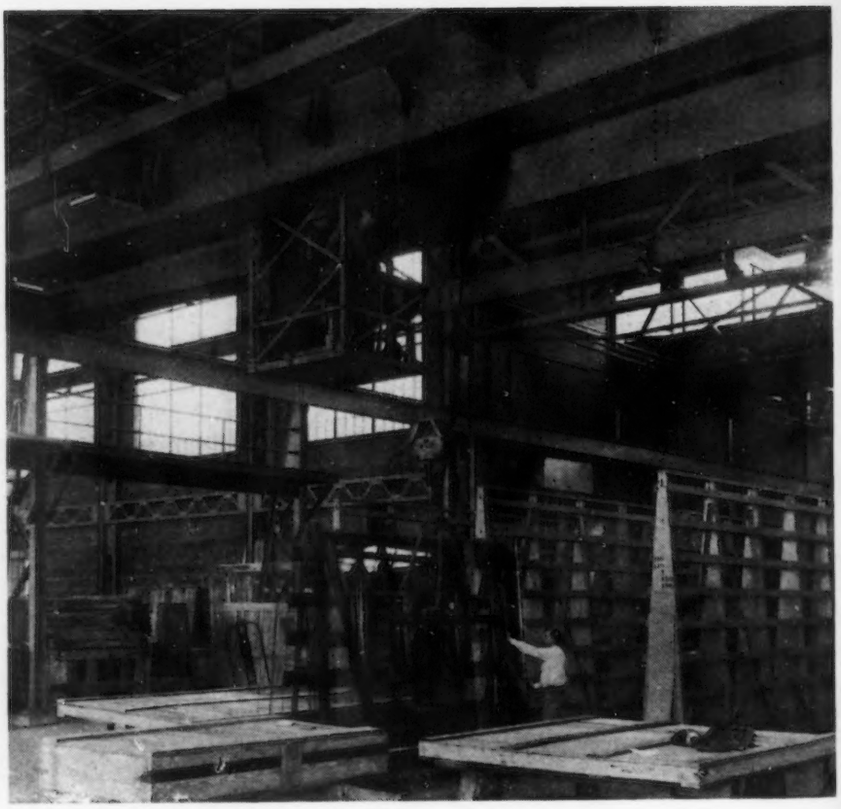
FIG. 5—A vacuum-operated grab for handling large sheets of glass, working from the cab of a 5-ton Whiting traveling crane.

4. Tong-Grabs. These mechanisms, in a thousand and one forms, all operate on the principle of a pair of tongs, either gripping the goods to be lifted by compression, or by permitting inwardly turned claws to fit under the load itself, or to engage with projecting lugs or ears on the load. They are used to handle piles or packs of flat material, such as sheets of metal or sticks of lumber, or sheets of glass, or ingot molds, or pallet loads of stacked goods, etc.

5. Special Hook-Rigs. Here we find a large and miscellaneous field of special-shaped equipment, including hairpin hooks, spreaders, etc., used for handling coils of strip or of wire, tube, pipe, sheets, boxes, crates, lumber, machine parts, etc.

6. Baskets, cages, platforms, batch-buckets, and rigs not included in the above categories. Included here are containers for holding loads of product to be dipped in cleaning solutions, galvanizing or tinning pots, paint, lacquer or enamel tanks, for passing through annealing or drying ovens, for taking bulk materials from storage to mixing equipment, and many kinds of miscellaneous handling rigs built for special purposes.

Practically every sort of rig used for handling materials or parts on overhead transfer operations may be classified in one or another of these six groups. In every case their use is conditioned on the idea of picking up and holding a load during transit easily, cheaply, surely and safely.



These are the four factors which, when met successfully, counteract the Achilles-tendon weakness of all overhead handling systems. The illustrations reproduced herewith have been selected for the purpose of emphasizing how various forms of sky-hooks meet these four factors satisfactorily.

The Illustrations

Fig. 1. Here is an example where the hoist-hook engages a handle which is made an integral part of the load. A hot-metal ladle is equipped with a form of holding rig in which it may be carried and which permits it to be tipped for pouring when the auxiliary

FIG. 6—A spreader rig with 3 double chains and hooks, working from a Browning 4-motored electric portal crane equipped with a 55-ft. boom.

and two upright ends. These pallets may be stacked one above the other in tiers, as shown in the left background of the picture. The handling grab takes hold of the four upright corner posts of the pallet, picks it up with its contained load bodily, and places it exactly where desired by the operator. Note that each pallet fits a four-wheeled dolly frame-work also, for handling over the floor. The crane in use here is a Northern, of 3-ton capacity and 96½-ft. span, equipped with three motors and cab-controlled.

Fig. 3 pictures a two-part chain sling with both parts united in a large link which engages in the hoist-hook. This is a common method of handling boxed sheet metal at warehouses and on shipping platforms. Here the Whiting 10 ton, 3-motor crane, of 46½ ft. span and 25 ft. lift, serves the end bay of a steel warehouse, and covers the entire loading floor used for railroad and motor truck shipping.

Fig. 4 illustrates the use of two single slings depending from the four hooks of a two-trolley crane used for setting the heavy floor frame of a

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AT RIGHT

FIG. 7—Circular magnet pick-ups on two 10-ton Whiting gantry cranes of 85 ft. span, as used in railroad reclamation service.

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hoist-hook is engaged in the ring fastened to the bottom of the ladle on the side opposite the pouring lip. The main hoist-hook simply engages in the handle of this rig. It should be noted that this holding rig is so constructed that the spreader-bar permits the disengagement of the rig from the lugs on the ladle itself, so that the ladle may be set down, and the rig carried off to pick up another similar ladle. The crane in this instance is a Whiting, of 60 ft. span and 44 ft. lift, with main hoist rated at 45 tons, and the auxiliary hoist rated at 20 tons capacity.

Fig. 2 shows a special handling grab for stacking bags, as used in a vitreous enameling plant in the middle west. The metal pallets are roughly U-shaped, consisting of a platform

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FIG. 8—A special handling rig designed to pick up and carry heavy, wide rolls of paper, working from a Northern 10-ton, 25-ft. span crane.

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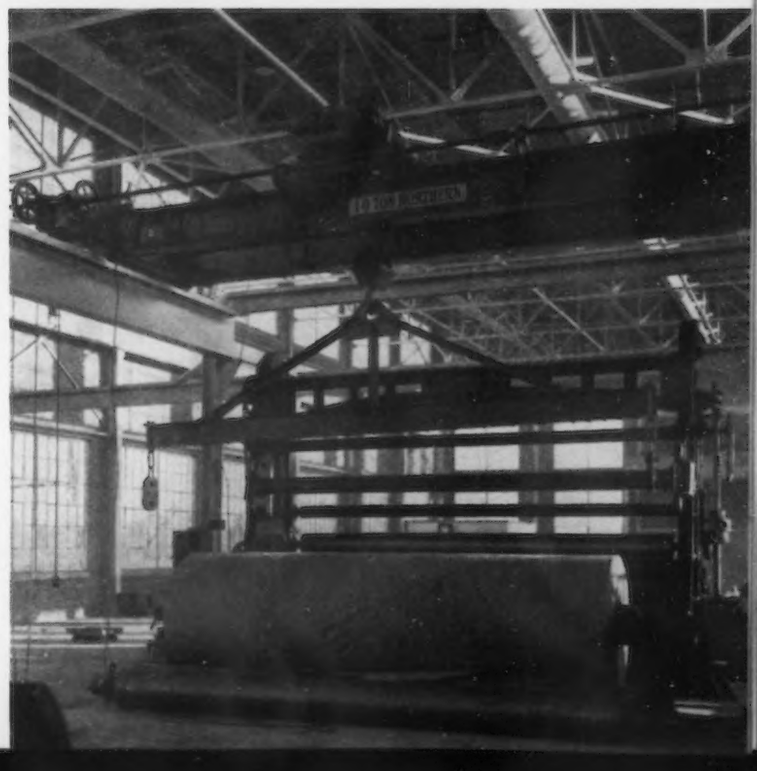

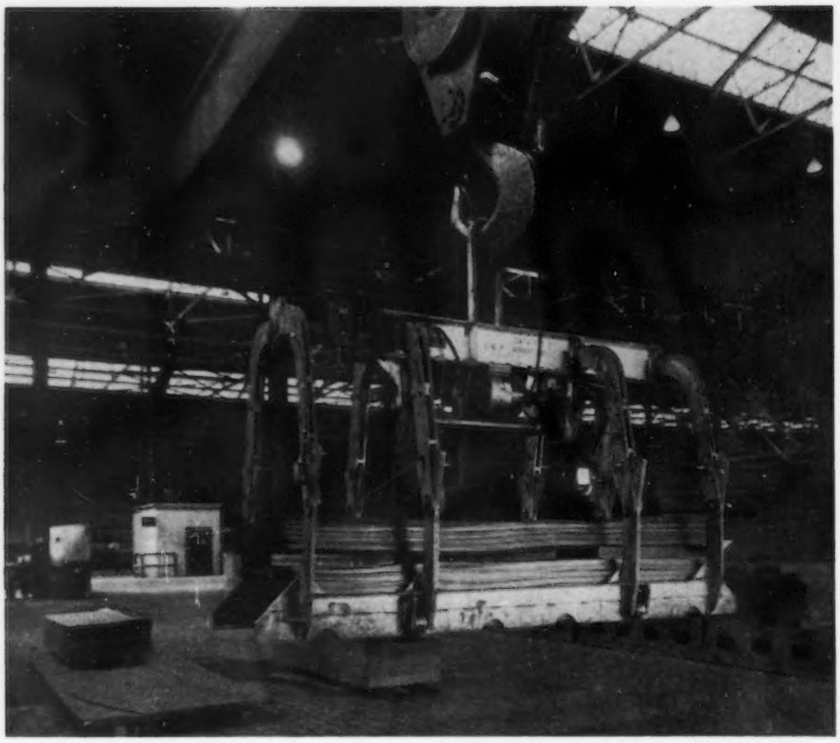

ABOVE

FIG. 9—The Cullen - Friestedt sheet metal grab, now a familiar sight in strip steel mills, handling a 39,000-lb. load of sheet metal.

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streamlined locomotive in place. The amount of work involved in such a job may be estimated from the size of the handling equipment used. It is a 200-ton Cleveland crane equipped with two 100-ton trolleys. As may be appreciated, all four hoist-hooks must travel up or down at exactly the same rate of speed, and must maintain an absolutely even position with respect to each other, at all times.

Fig. 5 is a very unusual picture. Large sheets of plate glass are handled by a vacuum-cup lifting attachment depending from a 5-ton Whiting crane. The vacuum action is controlled by the operator in the cab. Ten of these cranes with similar vacuum lifts are in use in the plant of a large mid-western glass manufacturer. The suction action is swift and positive, and has proved to be both economical and safe.

In Fig. 6 there is shown one of the many special spreader rigs made up of chain and structural shapes, which vary with the needs of the user. Here it is carried by a Browning four-motor electric portal crane equipped with a 55 ft. boom, as used at an assembly plant of a prominent automobile manufacturer. This crane, incidentally, is a very useful piece of apparatus. It runs on rails the full length of the dock, will lift five tons at 50 ft. radius out of the hold of a ship, and each crane function—traveling, rotating, hoisting, and raising or lowering the boom, is controlled by a separate motor from the cab.

In Fig. 7 two Whiting 10-ton electric traveling gantry cranes, each of 85 ft. span with 15 ft. overhand on each side, are shown equipped with large circular magnets, for reclamation service in a large eastern railroad yard.

Fig. 8 shows a special head-beam for handling heavy and wide rolls of paper in a large paper mill. At either end of the beam, link sections hold

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FIG. 10—The Cullen - Friestedt grab adapted to handling ingot molds through the graph'te-dipping and tar-spraying preparation processes.

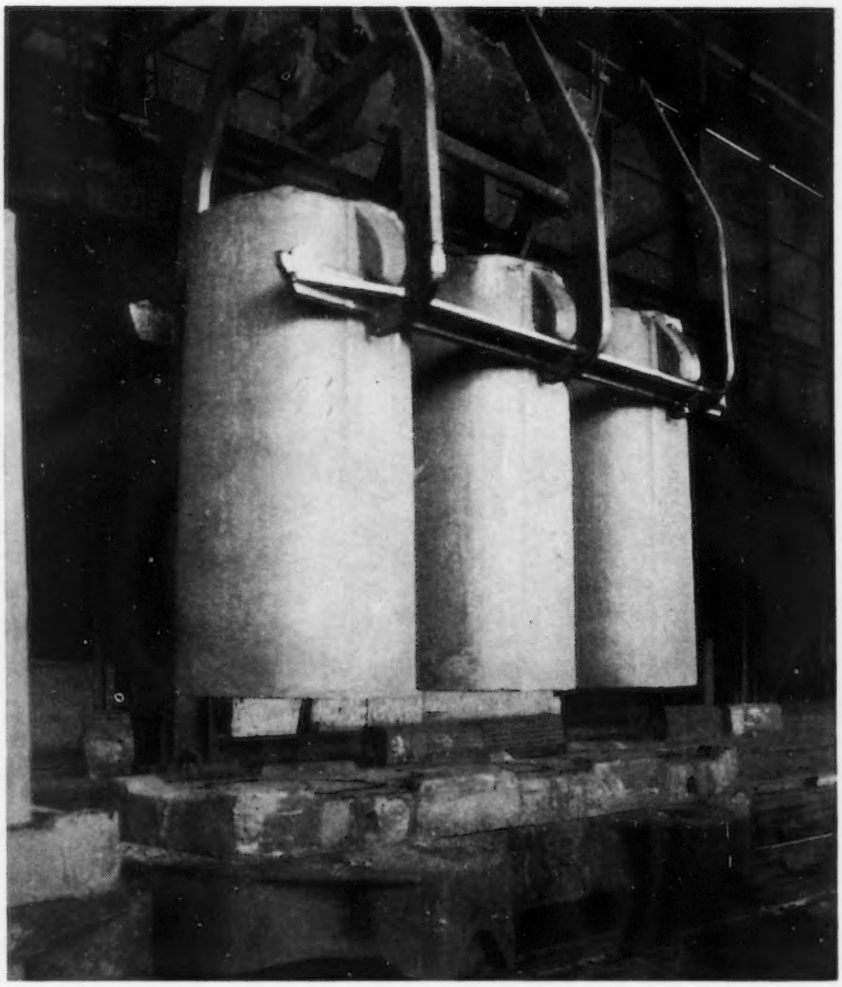

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FIG. 11—Aluminum alloy Shaw - Box cranes and clam-shell buckets of extremely light weight, operating in a rubbish incinerator plant.

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double-pin blocks. An eye on a shaft-clamp fitted to the shaft running through the wooden paper-spool is inserted into the block, the pin replaced, and the roll of paper is then ready to be picked up and shifted to storage or to the shipping platform. The crane is a one motor, 10-ton Northern of 25 ft. span. This type of rig is quite popular in paper mills.

Fig. 9 shows a Cullen-Friestedt sheet metal grab as used in scores of sheet and strip rolling mills. This is a form of tongs, electrically operated, in which inwardly projecting lips at the lower edges of the grab fit under the load to be handled. Heavy loads of metal may be picked up, carried and deposited by these grabs, quickly and safely. Here a 20-ton capacity motor-operated grab is shown handling a 39,000 lb. load of hot rolled sheets. This grab will handle sheets up to 60 in. wide. One advantage of handling by this means is that the scratching of high grade stock resulting from the handling of individual sheets, is eliminated. Special forms of grabs of this type are also made for handling hot castings in the quenching operations incidental to heat treatment, and for handling several automobile motor blocks at one time. See also the operation described in the next paragraph.

Fig. 10 is a special adaptation of the Cullen-Friestedt grab for handling up to four ingot molds through a graphite-dipping and tar-spraying process. The carrying angles of the grab engage the projecting ears of the molds, lift them from transfer cars, and in one continuous operation dip them in the graphite tank, pass them through

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FIG. 12—A special lumber - handling grab in a Pacific Coast lumber mill, working from a Whiting 10-ton, 64-ft. span crane.

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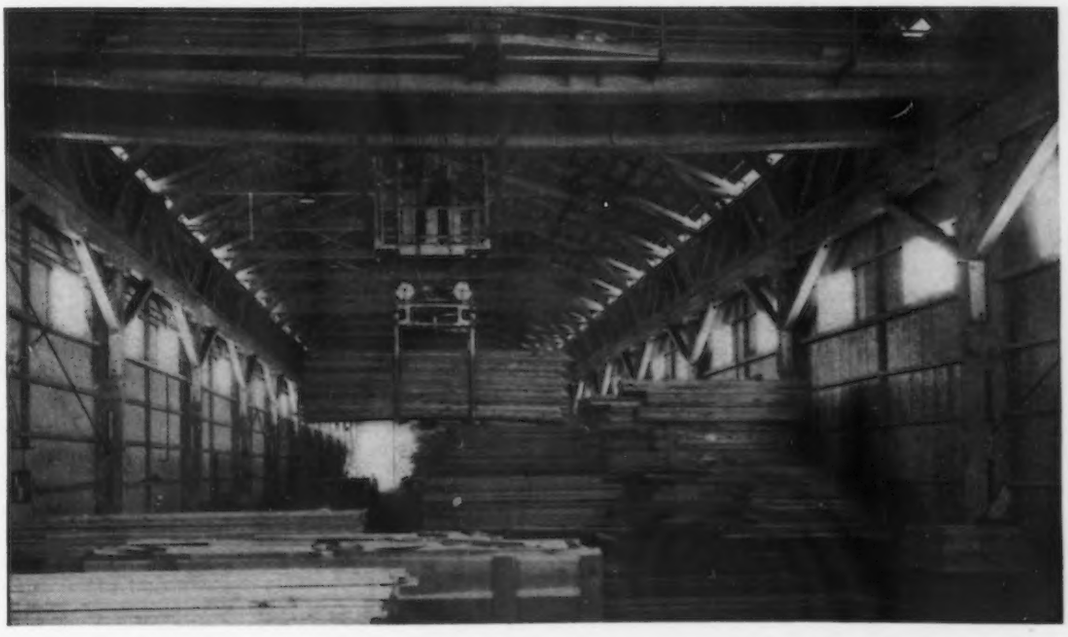

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THE lighting of Inland Steel Co.'s new 1000-ton furnace was the occasion of ceremonies in which Mrs. Madeline Block Straus, daughter of P. D. Block, president of the company, applied the "starter." With Mrs. Straus are G. H. Jones, one of the founders of the company; L. E. Block, chairman, and P. D. Block.

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Inland Steel Co. Honors Founders in Lighting

THE ceremony which accompanied the lighting of Inland Steel Company's new 1000-ton blast furnace last week was significant not only because the Madeline No. 5 is Inland's largest stack and the first built in 12 years, but also because it provided an occasion for honoring Inland's founders, G. H. Jones and L. E. and P. D. Block, sons of Joseph Block, one of the original financial backers.

The formation of Inland came about through the inability of the old Chicago Steel Works to pay freight charges on a trainload of machinery being shipped to a new plant in Chicago Heights, Ill., during the depression of 1893. The company held a contract with the Chicago Heights Land Association for the erection of certain buildings, in which old machinery was to be installed and operated, but funds were not available even for this work. Banks were reluctant to make loans, however, and few individuals dared to venture their cash, so the machinery was shuttled back and forth between Chicago and Chicago Heights on railroad cars while efforts were being made to raise the necessary money. Finally those interested in the project were obliged to give it up altogether, and with it the Chicago Heights Land Association contract.

Financing Obtained

Meanwhile, two men, G. H. Jones and Frank Adams, were trying to interest capital in proceeding with the work from where the others had been forced to stop. Finally sufficient funds were secured through Joseph Block, president, Block-Pollak Iron Co., Cincinnati; Joseph E. Porter, manufacturer of hay tools and other agricultural equipment, Ottawa, Ill.; Elias Colbert and Frank Wells, both of Chicago. The machinery from the old Chicago plant was purchased, a new Chicago Heights contract drawn, and the new company, named Inland Steel Co., at the suggestion of Mr. Jones, was incorporated in 1893.

Mr. Porter became first president, but in name only. Mr. Jones, who had been associated with Hall Kimbark & Co., Chicago steel jobbers, as country sales manager, was made vice-president in charge of sales, and the chief executive officer. P. D. Block, son of Joseph Block, and now president of Inland, who had been with the Cincinnati Forge & Iron Co., came to the new organization to assume the financing, purchasing and general mill supervision.

Joseph Block ultimately became the largest individual stockholder, though the firm of Block-Pollak declined to participate. The original capital stock was $130,000 with first credit largely supplied by the First National Bank of Chicago. The company has done its business with this bank ever since, and today Inland's general offices in Chicago are in the First National Bank Building.

L. E. Block, another son of Joseph and now chairman of the board, came to the company in 1897, while a third son, E. J., now vice-president, and director of purchases, came in 1901.

Now associated with Inland are two sons of L. E., J. L., who is executive vice-president, and Leigh, assistant vice-president. P. D. Block, Jr., also is an assistant vice-president. His sister, Madeline, who is now Mrs. H. H. Straus, has lighted all of Inland's five blast furnaces.

Mr. Jones, now a director of Inland, after serving as president and vice-president, retired in 1921. He is now president of Hillside Fluorspar Mines, Midwest Forging & Mfg. Co., Pershing Quicksilver Co., and a director of the Buffalo Steel Co.

First Blast Furnace in 1907

In 1907 the first blast furnace was erected, a bond issue of $3,000,000 having been sold to the First Trust & Savings Bank, Chicago. Arthur G. McKee & Co., who built Inland's new stack, also built the first furnace 32 years ago.

The Indiana Harbor plant began operations in 1901 but pig iron was purchased until Alex W. Thompson, president of the then Republic Iron & Steel Co., and owner of the Laura ore mine, came to Inland and superintended the construction of a blast furnace. Coal originally was used in the plant but oil was soon substituted and a pipe line installed from the Standard Oil refinery at Whiting, Ind.

Since that first blast furnace in 1907 the growth and progress of Inland has been steady, culminating in the 1000-ton stack blown in last week. Earlier in 1938, five open hearths, which increased annual ingot capacity 420,000 tons to 2,760,000 gross tons a year, 59 coke ovens, and a 44-in. continuous strip mill were placed in operation, the biggest expansion year in Inland's history.

It is interesting to point out that most of Inland's progress has been accomplished in poor business years. Founded in 1893, the first blast furnace was built in the panic year of 1907. In 1932, a 76-in. continuous strip mill was installed, and 1938 is generally acknowledged to have been an exceedingly lean year, even surpassing 1932 in that respect in some instances.

Of unusual interest is the fact that had the old Illinois Steel Co. in 1893 been willing to spend $11,000, the cost of moving and installing the old Chicago Steel Works machinery in the new Chicago Heights plant, the Inland Steel Co. probably would not be in existence today.

Workers Participate in Ceremony

A crowd of several hundred workmen cheered when Mrs. Madeline Block Straus, daughter of P. D. Block, pressed the button lighting the furnace, which plant officials say will be operated to its full capacity in anticipation of increasing needs for pig iron as business improves in the first quarter. Short talks were made by J. H. Walsh, works manager; H. W. Johnson, blast furnace superintendent, and E. L. Ryerson, Jr., vice-chairman.

A commemorative plaque consisting of an etching of the new stack on metal mounted on an ebony base was presented to L. E. and P. D. Block, Mr. Jones and Mrs. Straus by Wilfred Sykes, assistant to the president.

The installation of Inland's new

1000-Ton Blast Furnace . . .

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A REPRODUCTION of a metal etched placque of Inland Steel Co.'s new blast furnace No. 5, which was presented to L. E. Block, chairman; P. D. Block, president; G. H. Jones and Mrs. Madeline Block Straus by Wilfred Sykes, assistant president.

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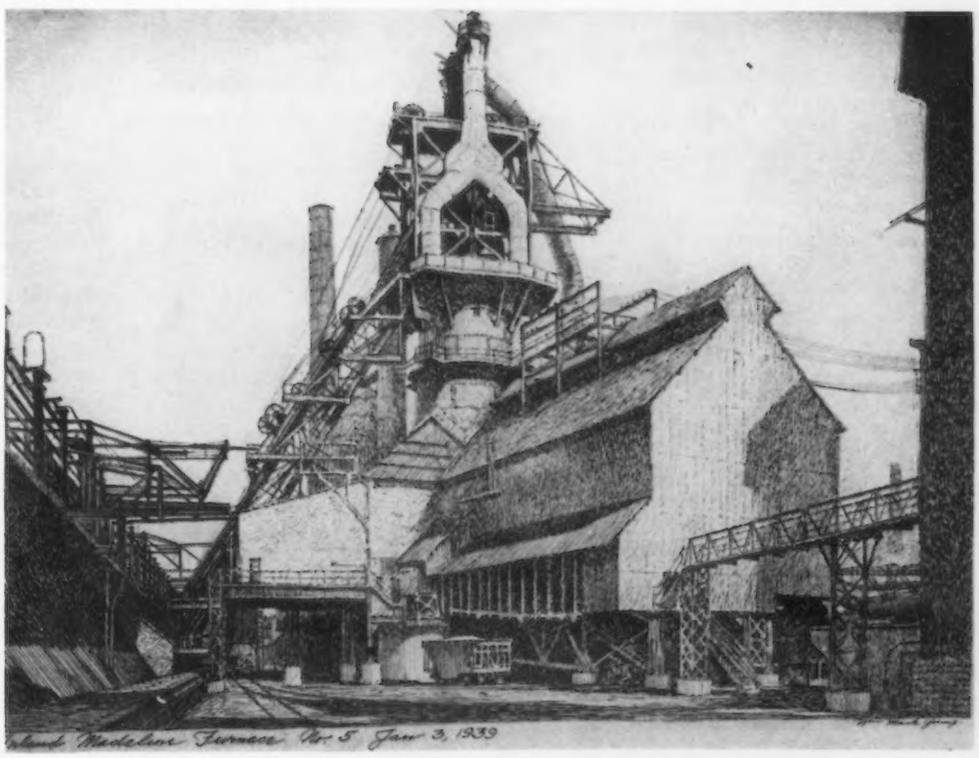

blast furnace brings the company's pig iron capacity to about 4000 tons daily. In erecting the stack it was necessary to build on step-tapered piles 90 ft. long driven into hard pan, because of the sandy soil of the shores of Lake Michigan, where the mill is located. The cast house is supported by spread footings and the dust catcher and skip hoist rest on "H" beam piles. Stove foundations are of reinforced concrete cellular construction.

An unusual feature of this furnace is the crank action used in operating the bell mechanism instead of the conventional bell beam. From the dumping point of the skip car to the bottom of the large bell hopper is only 22 ft. 11 in., which minimizes the breakage of material. The large bell reaches its closed position so slowly that no impact is noticeable. Speed of dumping the large bell may be varied over a 20 per cent range. Skips are operated from 300 ft. a min. to a maximum of 600 ft. a min.

The stoves are 26 ft. in diameter and 110 ft. high. Checkers are of basket weave construction with Brassert fillers. Each stove has approximately 200,000 sq. ft. of heating surface and about 50 sq. ft. of combustion chamber. Freyn burners have capacity for burning 22,500 cu. ft. of gas a minute. If necessary only two stoves can operate the furnace and can maintain blast temperatures of 1200 to 1300 deg. F.

Gas is taken off at four points spaced 90 deg. apart and carried through a 20-ft. diameter McKee gas washer. Special construction causes the length of travel of gas through each off-take to be exactly the same assuring uniform gas distribution in the stack as far as may be influenced by this equipment.

An intermediate platform has been erected on the furnace shell about 26 ft. below the top platform for the purpose of taking accurate temperature readings.

The new stack has 14 tuyeres and seven columns. Columns are 426-lb. "H" beams with 2-in. cover plates. Hearth diameter is 25 ft. and diameter at top of bosh is 28 ft. The stockline diameter of 19½ ft. may be increased to 21 ft. if desired.

Westinghouse Electric & Mfg. Co. has licensed the A. W. Cadman Mfg. Co., Pittsburgh, to manufacture cupaloy, a copper alloy. In addition to its other products, the Cadman company will supply cupaloy in cast shapes.

. . PERSONALS . .

C. A. McDOWELL has been appointed assistant superintendent of bar mills at Gary works of Carnegie-Illinois Steel Corp. Mr. McDowell began his service in the steel industry as a roll turner apprentice in 1907 at the Newburg works of the American Steel & Wire Co. After four years he was made roll designer and turner, a position he held until 1914. Leaving the corporation at this time, he was employed with various companies as assistant roll designer, assistant superintendent, general superintendent, and general superintendent of rolling mills. He goes to Gary works from the Pittsburgh Steel Co., where he has been superintendent of rolling mills since 1936.

A. V. MARTIN has been appointed superintendent of steel provision, West mills, and J. FRANK FRAIN assistant superintendent merchant bar mills at Gary works of Carnegie-Illinois Steel Corp. Mr. Frain's duties will parallel those of C. A. McDowell.

Mr. Martin's entire career in the steel industry has been with subsidiaries of the United States Steel Corp. at Gary, Ind. He was employed in 1915 by the American Sheet & Tin Plate Co. and later served as load checker and finishing end foreman of the Gary works merchant mills until 1918 when he was transferred to the general superintendent's office. He became general office assistant in January, 1938 and remained in that position until his present appointment.

Mr. Frain began work with the corporation as a foreman for the National Tube Co., Ellwood City, Pa., in 1922. A year later he was transferred to the Tube company's Gary plant as assistant superintendent of the pipe mill and remained in that capacity until 1929. Leaving the corporation, he spent four years as assistant plant manager of the Lyon Metal Products Co., Aurora, Ill., until his return to the Gary works merchant mills. In 1934 he again left the corporation to be general superintendent of Babcock & Wilcox Tube Co., Beaver Falls, Pa., remaining with them until his return to Gary works at this time.

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J. H. KENNEDY has been appointed superintendent of the electric furnace department of Republic Steel Corp. He has been with Republic or its antecedent companies since 1916, when he entered the employ of United Alloy Steel Corp.'s electric furnace department. At the time of the World War he joined the Marines and returned to United Alloy in 1919, advancing to the position of melter in 1925. He is a native of Canton, Ohio, and was educated in that city.

PAUL L. WALTER, superintendent of power in the Canton plant, has been named superintendent of the mechanical department. Mr. Walter

C. A. McDOWELL

was graduated from Purdue University in 1912. In 1916 he was awarded the Western Conference Athletic Association medal for highest standing in scholarship, athletics and all-around student activities. After graduation he joined Pickands, Mather & Co. as civil engineer during the construction of the coke ovens and blast furnace at the United Furnace Co. plant, Canton. He entered the Army in 1918 and was commissioned as a Second Lieutenant in Field Artillery and served as instructor at Camp Taylor. After the war he returned to United Furnace Co. and in 1919 was made efficiency engineer and in 1921, chief engineer in charge of the power plant. When United Furnace merged with United Alloy Steel Corp. he became assistant superintendent of power and in 1922 was promoted to superintendent of power.

Z. W. WHITEHOUSE has been made superintendent of the electrical department, Canton works. He was born in England and came to the United States when one year old. He attended the Canton public schools and Y.M.C.A. night schools and took his first job as machinist apprentice with United Electric Co., Canton. Later he was employed by Dillon Electric Co. and in 1915 became electric shop foreman with United Steel Co. He later served as electrical foreman, south division, blast furnace division and Canton steel division.

W. M. FARNSWORTH, formerly superintendent of the electric furnace department of Republic Steel Corp., has been named general superintendent of the company's Canton, Ohio, plant, succeeding the late B. R. RICHARDSON.

Mr. Farnsworth was born in Nashville, Tenn., and was educated in the public schools of that city. He entered the employ of the United States Steel Corp. of South Chicago in 1914 and went to Canton in 1919, where he worked until 1925 as melter in the electric furnace department of Timken Roller Bearing Co. In 1925 he joined the United Alloy Steel Corp. as superintendent of electric furnace department and retained this position through the mergers which finally brought that company into Republic Steel Corp.

A. G. DELANY, formerly superintendent of maintenance Gulfsteel division, Republic Steel Corp., has been named assistant district manager. He studied mechanical engineering at Georgia School of Technology and hydraulic engineering at Ohio State University, then became construction engineer and superintendent for eight years with Dwight P. Robinson Co., working in both the United States and South America. He also was employed for eight years with Gulf States Steel Co. as construction engineer and superintendent of maintenance, retaining that position following the merger of Gulf States Steel with Republic.

G. H. DAVIS has been named master mechanic, heading the mechanical department for the Gulfsteel division, and C. R. FLETCHER has been made mechanical general foreman.

EARL M. RICHARDS, assistant to the vice-president in charge of operations, Republic Steel Corp., since 1933, has been named assistant vice-president.

Mr. Richards will continue in charge of the operations of the corporation's subsidiaries. In 1937, C. H. ELLIOTT was also appointed assistant vice-president in charge of operations.

After graduation from Bucknell University in 1913, Mr. Richards was first associated with the Westinghouse Air Brake Co. as assistant to the chief engineer and assistant to the manager of engineering, remaining there until 1919. From 1920 to 1925 he acted as consulting electrical and mechanical engineer, and in 1925 was made chief industrial engineer of the Jones & Laughlin Steel Corp., Aliquippa works. He remained with Jones & Laughlin until 1930, when he was appointed chief industrial engineer of Republic Steel Corp. and subsidiaries.

A. V. MARTIN

J. F. FRAIN

During the war Mr. Richards was technical adviser of Fuel Conservation Committee of Western Pennsylvania and at the request of the United States Railroad Administration was sent to Washington as special engineer to supervise tests and investigations of railroads throughout the country. He holds the rank of Captain in the Reserve Corps of the United States Army.

D. D. BUCHANAN has been appointed manager of operations of the Union Drawn Steel division, Republic Steel Corp., with offices in Massillon, Ohio.

Mr. Buchanan has been associated with Union Drawn Steel for 15 years. Prior to 1930 he was manager of No. 3 plant at Beaver Falls, Pa., and since that time has been assistant general manager. He started with Cambria Steel Co., Johnstown, Pa., in the hot mills. Later he was connected with Jones & Laughlin Steel Corp. at Pittsburgh, and with See-Seldon, industrial engineers, Pittsburgh.

F. A. KELLY, who has been head of the building products coordination department of Republic Steel Corp., Cleveland, is now manager of the newly created sales development and coordination division of Republic. F. H. RAMAGE, who headed the sales promotion division of the product development division, has been named assistant manager. The new division is a combination of the building products and the sales promotion divisions.

P. J. SANDMAIER, formerly secretary to C. M. WHITE, vice-president in charge of operations, Republic Steel Corp., has been named assistant manager of orders. Mr. Sandmaier was born in Johnstown, Pa., where he received his education in accounting and business administration. In 1907 he entered the steel business as office boy for the Cambria Steel Co. in the Gautier mills. He remained with the company until 1916 and became chief production clerk of the division. Later he joined the Donner Steel Co., Buffalo, as assistant chief cost clerk. In 1921 he was made secretary to the vice-president and general manager of the company. When Republic Steel Corp. was formed Mr. Sandmaier was made secretary to the vice-president in charge of operations. During the War he served in the aviation division of the Signal Corp.

R. D. SCHAD has been appointed chief clerk of the general order department.

EDWARD I. EVANS, whose appointment as manager of the Gulf district

of Republic Steel Corp. was announced in these columns last week, was transferred to the South as general superintendent late in 1937 from Buffalo, where he had been assistant district manager for Republic. He was born in Glasgow, Scotland, in 1887, and came to the United States in 1907, first being associated with the Worth Steel Co. at Coatesville, Pa., in the open hearth department. In 1915 he joined the United States Steel Corp. at its Duluth plant and in 1916 returned to the Worth Steel Co. as assistant bolt and nut superintendent. Two years later, he was made open hearth superintendent. In 1929 he joined Bourne-Fuller Co., Cleveland, as general manager, and three years later was made assistant manager of the Canton district for Republic Steel Corp. He went to Buffalo in 1934.

C. L. BRANSFORD, who as announced last week is the new manager of the Birmingham district, was graduated from the University of North Carolina. He joined the Tennessee Coal, Iron & Railroad Co. as chemist after graduation and was later made superintendent of the Alice furnace plant in Birmingham. In 1915 he left to go with Gulf States Steel Co. as superintendent of the blast furnace department and four years later became superintendent of blast furnaces for the Woodward Iron Co. In 1921 Mr. Bransford went with Semet Solvay Co. as fuel engineer and later was made general manager of the company's Ashland, Ky., plant. From there he was transferred to Buffalo as superintendent of the company's plant in that city. In 1929 he returned to Birmingham as superintendent of blast furnaces and coke ovens for the old Republic Iron & Steel Co.

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FRANK SCHUBERT, who has been identified in a sales executive capacity with the Houde Engineering Corp., Buffalo, for the past two years, has been appointed assistant general manager. He formerly was assistant to the president of the Bearings Corp. of America. Previously he served as consulting engineer and works manager of planning, equipping and operating the anti-friction bearing plant at Moscow, Russia. For a time he also served as vice-president and general manager of the McGill Metal Co., Valparaiso, Ind. He is a graduate of the Case School of Applied Science.

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J. H. CRITCHETT has been elected president of the Electro Metallurgical Co., New York.

WILLIAM BRUCE OGDEN, formerly assistant general manager of sales, has been appointed general manager of sales, Valley Mould & Iron Corp., Hubbard, Ohio, succeeding the late Ralph C. Velte. Mr. Ogden, who was born in Lincoln, Neb., received his higher education at Doane Academy and Cornell University. His training in the iron and steel business was obtained with Pickands, Mather & Co., Arthur G. McKee & Co., Brier Hill Steel Co., and the old Republic Iron & Steel Co. before going to Valley Mould & Iron 14 years ago. He resides in Youngstown.

W. B. OGDEN

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VICTOR E. WILLIAMS, manager of the New York Sales branch of Monsanto Chemical Co., has been named assistant general manager of sales. In his new position, Mr. Williams will divide his time between New York City and the St. Louis headquarters of Monsanto, residing in New York. A. T. LOEFFLER, who has been assistant manager of the New York branch, will succeed Mr. Williams. F. C. RENNER, assistant general manager of sales, Merrimac division of Monsanto, Boston, has been promoted to succeed Mr. Loeffler at New York.

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F. S. FOLLANSBEE has resigned as chief engineer of the Koppers Coal Co., to become chief engineer of the Pittsburgh Coal Co. Mr. Follansbee was chief engineer of Koppers since 1923.

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JAMES L. MAUTHE, general superintendent of Youngstown district plants of Youngstown Sheet & Tube Co., has been appointed a trustee of Pennsylvania State College.

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WILLIAM C. HOOD has been appointed general superintendent, H. C. Frick Coke Co., Pittsburgh, a subsidiary of the U. S. Steel Corp., succeeding CLAY F. LYNCH, who has resigned. Mr. Hood returns to the Frick Co. after an absence of a year, during which time he was general superintendent of the U. S. Coal & Coke Co., also a subsidiary of the U. S. Steel Corp. He has been with the Frick and associated companies since 1897.

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DAVID E. ANDERSON, automotive engineer, widely known in the industry for his research work on internal combustion engines and fuels, has joined the Holley Carburetor Co. as research engineer. Until recent he was chief engineer of the Bohn Aluminum & Brass Corp., Detroit. Mr. Anderson is a member of the Society of Automotive Engineers.

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LEROY M. NASH, Dow Chemical Co. metallurgist, will be manager of the new Dowmetal foundry of the Midland company now being constructed in Los Angeles.

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JOHN W. GREVE, formerly associated with the technical press section, Westinghouse Electric & Mfg. Co., has joined the staff of *Machine Design*, Cleveland, as an associate editor. Mr. Greve has been with the Westinghouse company since his graduation from Carnegie Institute of Technology in 1929.

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FRANK M. BLAUROCK, who has represented the Andrews Steel Co, Newport, Ky., in the Chicago and Milwaukee district for the past 28 years, has resigned his position. Mr. Blaurock has opened an office in the McCormick Building, Chicago. No announcement of his future plans has been made.

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EMMET SHEAHAN, the operations manager of United States Rubber Co. Detroit and Indianapolis plants, assumed also the title and duties of general manager of the new automo-

tive division of the rubber company on Jan. 1, it was announced by F. B. DAVIS, JR., president and chairman of the board. The new division will have headquarters in Detroit and will include operations affecting all of the many products developed and sold by the United States Rubber Co. in its various factories for use by automobile makers in the manufacture of cars.

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CHARLES R. HOOK, president of the American Rolling Mill Co., has been made a special term member for five years on the corporation of the Massachusetts Institute of Technology.

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JAMES PLUMMER, for the past 48 years purchasing agent of the Newport News Shipbuilding & Dry Dock Co., Newport News, Va., has retired. H. K. PEEBLES has been appointed acting purchasing agent, with office at the plant at Newport News. J. M. CLAWSON, assistant purchasing agent, will continue to be located at 90 Broad Street, New York. DONALD GAY is assistant purchasing agent and material agent, with office at Newport News.

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ROBERT J. NELSON, Arcade Malleable Iron Co., Worcester, Mass., has been president of the New England Foundrymen's Association to succeed HENRY A. JENSEN.

Other officers elected were: Vice-president, FRANCIS LEBARON, E. L. LeBaron Foundry Co., Brockton, Mass.; treasurer, ARTHUR W. GIBBY, East Boston; secretary, ERNEST F. STOCKWELL, Barbour-Stockwell Co., Cambridge, Mass.

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R. M. ALVORD, who has been identified with the General Electric Co. since 1906 and who is district manager of the Pacific district of the company, has been appointed commercial vice-president. JOHN E. N. HUME, manager of the industrial department, Schenectady, and A. S. MOODY, district manager of the Northwestern district of the company, have been appointed commercial vice-presidents.

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W. C. STEVENS, vice-president in charge of engineering, Cutler-Hammer, Inc., Milwaukee, has announced the advancement of E. W. SEEGER to the office of chief engineer, and P. B. HARWOOD to assistant chief engineer. Mr. Seeger, who joined the firm in 1913, shortly after being graduated from Ohio State University, has been for several years assistant chief engineer. Mr. Harwood, with the firm since his graduation from Carnegie Institute of Technology in 1917, has been general engineering supervisor in recent years.

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A. H. WHEELER, who represented the American Screw Co. of Providence, for 10 years in eastern Pennsylvania, New York and northern Ohio, has joined the sales organization of the Lamson & Sessions Co., Cleveland. Mr. Wheeler has been with his former company for the entire 10 years since he was graduated from Carnegie Tech.

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SIR ROBERT HADFIELD, the famous British metallurgist and chairman of Hadfields, Ltd., has just celebrated his 80th birthday.

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KING R. H. NELSON, formerly connected with the general sales department of Carnegie-Illinois Steel Corp. is now associated with the Ferdinand G. Schultz Co., Pittsburgh.

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CHARLES H. HUGHES, of 270 Broadway, New York, for many years research engineer and designer of equipment for Semet-Solvay Engineering Corp., has been employed as a consulting refractory engineer by North American Refractories Co., Cleveland.

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S. E. CONNAIR has been made plant engineer at the Inland Mfg. Division, General Motors Corp., Dayton, Ohio. G. D. MCLAUGHLIN has been transferred to the Rahway, N J., division of the company.

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G. H. HEDRICK, formerly sales engineer for the Thomas Spacing Machine Co., and for the past 10 years chief engineer for the Gem Mfg. Co., has been appointed chief engineer of the muffler division of the Maremont Automotive Products, Inc., Chicago.

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GEORGE W. LANDY, of Peoples Iron & Metal Co., Minneapolis, has been elected first vice-president of the Northwest chapter of the Institute of Scrap Iron and Steel, Inc.; SIDNEY R. ROBINSON, Fort Dodge Iron & Metal Co., Fort Dodge, Iowa, has been elected second vice-president, and ISRAEL C. MARK, of Mark Iron & Metal Co., Minneapolis, is secretary-treasurer. SOLOMON H. ROSEN, of Union Scrap Iron & Metal Co., Minneapolis, has been reelected president.

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JOHN M. BIRKENSTOCK, who has been associated with the Green Fuel Economizer Co., Inc., Beacon, N. Y., since 1924, has been elected vice-president and general manager. He was graduated from Stevens Institute of Technology in 1913 and was previously employed by the Babcock & Wilcox Co. CLINTON S. MESSLER, vice-president and chief engineer, takes charge of production. He has been chief engineer of the company since 1917 and is a graduate of Worcester Polytechnic Institute.

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W. ROY MOORE, for many years vice-president and general manager of the Billings & Spencer Co., has been named director of sales of the Peck, Stow & Wilcox Co., Southington, Conn. WILLIAM O. SEIFERT, manager for many years of the machinery division, has been made sales manager of the newly amalgamated machinery and tools and hardware divisions. ELMER J. MURRAY, who has been traveling representative of the tools and hardware division, is now assistant sales manager. FLOYD J. NEAL, formerly manager of the tools and hardware division, is now manager of production.

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GEORGE C. BRAINARD, president, General Fireproofing Co., Youngstown, has been named chairman and agent of the Cleveland Federal Reserve Board for 1939.

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G. A. PARK, formerly assistant sales manager, Norton Co., Worcester, Mass., has been appointed Eastern sales manager in charge of the territory east of and including the Pittsburgh district. R. M. JOHNSON, formerly sales engineer, has been appointed Western sales manager, and will have charge of the Cleveland, Detroit and Chicago warehouses and other western territories. A. G. GREEN, of the research laboratories, will take over the position of sales engineer formerly held by Mr. Johnson. W. R. MOORE, as the newly-appointed general sales manager, will direct the activities of these three men. Mr. Moore will report to H. K. CLARK, vice-president. W. T. MONTAGUE has been appointed assistant vice-president. He will continue to supervise the staff activities of the sales department, including sales research, publicity, sales

(CONTINUED ON PAGE 62)

THIS WEEK ON THE ASSEMBLY LINE

o o o

By W. F. SHERMAN
Detroit Editor

o o o

. . . Industrial rebound after holidays starts auto production on upward climb . . . Strike and ICC decision on auto freight rates brings railroads and truckers into conflict . . . Purchasing agents follow short-term program during mid-winter.

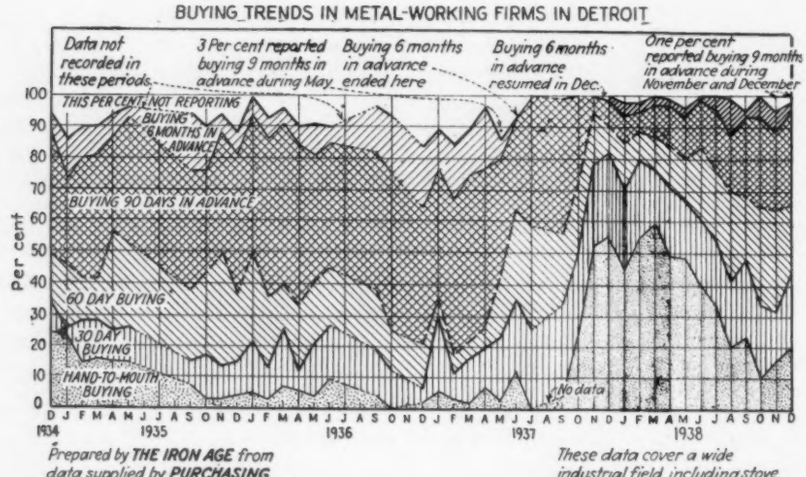
DETROIT — With employment reaching its 1938 peak in the latter half of December and automobile sales continuing at a substantially high level, production has recovered from its year-end dip.

Steel buying, which is expected to benefit during this first month of 1939, picked up more slowly in the first week than some of the local sales offices had expected. However, prices are reported firm and good-sized tonnages are believed to be in the offing.

Despite what is conceded to be a normal mid-winter dip, the delivery situation is somewhat more exciting than might be expected. Almost all of the parts suppliers and accessory manufacturers are hammering incessantly for speedier delivery of steel. This is particularly true of Ford suppliers, who let their inventories approach zero at the year's end and then unexpectedly got heavy releases from their important customer.

This bears out a point made in the Assembly Line just a week ago — assemblies of cars is somewhat lower but production of parts is being stepped up rapidly to provide huge banks of parts and sub-assemblies for an anticipated spring boom, or boomlet.

The automobile delivery situation isn't entirely at ease either. One important steel company, which is attempting to replace a fleet of cars for its salesmen, has waited six or eight weeks to get some Big Three models which are on order. Delivery date is still vague.


BUYING TRENDS IN METAL-WORKING FIRMS IN DETROIT
Data not recorded in these periods
3 Per cent reported buying 9 months in advance during May
Buying 6 months in advance ended here
Buying 6 months in advance resumed in Dec.
One per cent reported buying 9 months in advance during November and December
THIS PER CENT NOT REPORTING
BUYING 6 MONTHS IN ADVANCE
BUYING 90 DAYS IN ADVANCE
60 DAY BUYING
30 DAY BUYING
HAND-TO-MOUTH BUYING
No data
Per cent
100
90
80
70
60
50
40
30
20
10
0
D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D
1934
1935
1936
1937
1938

Prepared by ***THE IRON AGE*** *from data supplied by* ***PURCHASING AGENTS ASSOCIATION OF DETROIT***

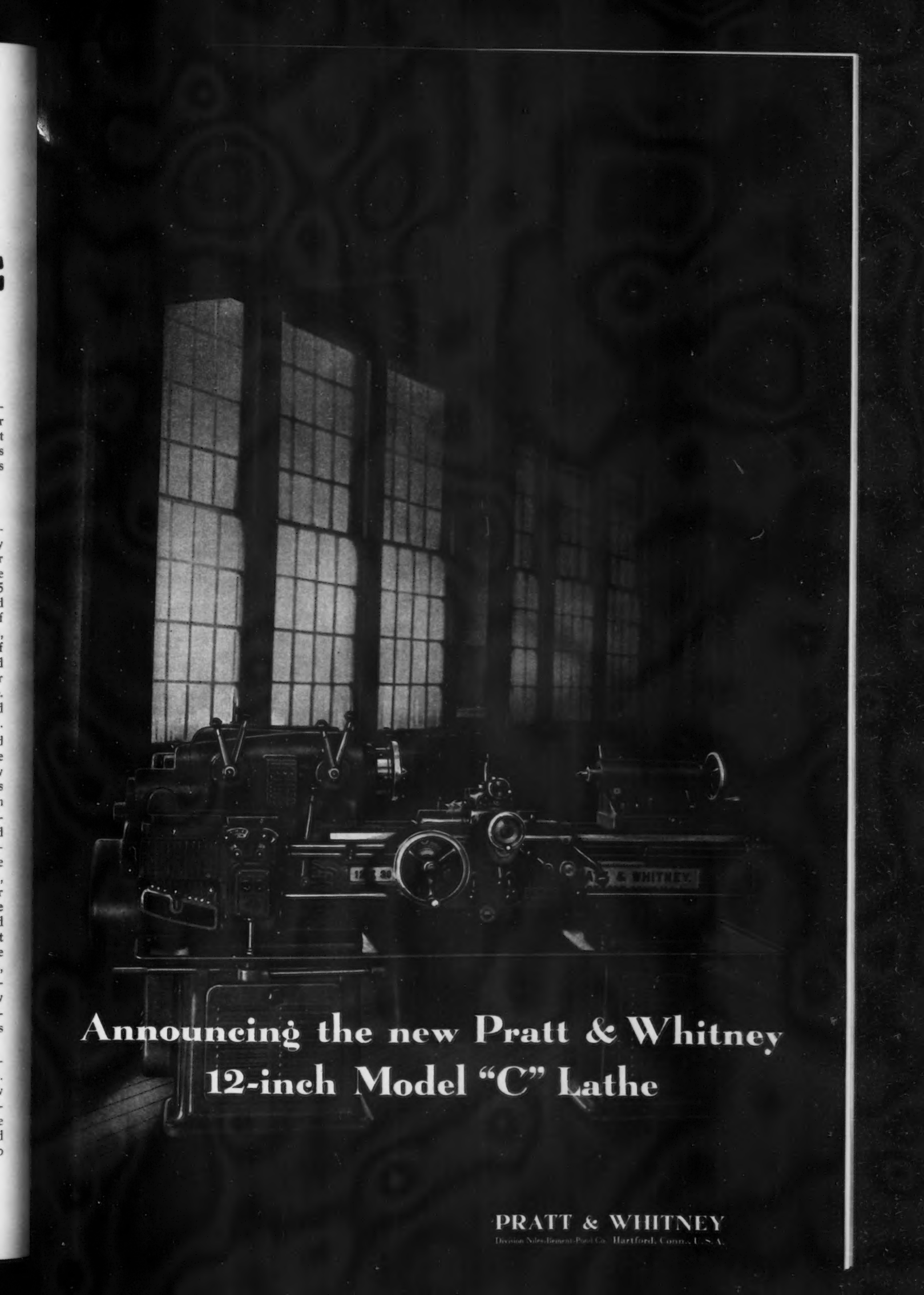
These data cover a wide industrial field, including stove, refrigerator, office equipment, steel, auto parts, accessory and auto plants

Haulaway Drivers Strike

The problem of delivering automobiles has been accentuated recently by two factors, a strike of drivers for two auto hauling companies, and the weather. The strike, involving 185 drivers, occurred last Thursday and temporarily tied up the distribution of Buick cars through Michigan, Indiana, Ohio and Illinois. A breakdown of negotiations for renewal of a closed shop union agreement with a 10 per cent wage increase caused the strike. Within 24 hours, Buick officials had arranged to handle their cars by rail.

Coincidently, word was received here that the Interstate Commerce Commission had authorized the New York Central Railroad to reduce rates for transporting automobiles from factories in the Detroit area to destinations throughout the north and east. The National Automobile Transporters Association, division of the American Trucking Association, Inc., has predicted a nationwide rate war between railroads and trucks. The trucking group proposed that rail and truck rates be placed on a parity. It is not generally believed that the truckers will be able to reduce rates, however. Railroad freight agents express this opinion, based on the low margin of profit for trucking companies and the fact that the drivers are demanding wage increases.

Icy roads during the Christmas season delayed many haulaway trucks. Underwriters frequently withdraw their support when highway conditions are very icy because the huge tractor-trailer combinations, loaded with new cars, sometimes get into



Announcing the new Pratt & Whitney 12-inch Model "C" Lathe

PRATT & WHITNEY

Division Niles-Bement-Pond Co. Hartford, Conn., U. S. A.

serious difficulties with resultant high damages.

Output Gains Slightly

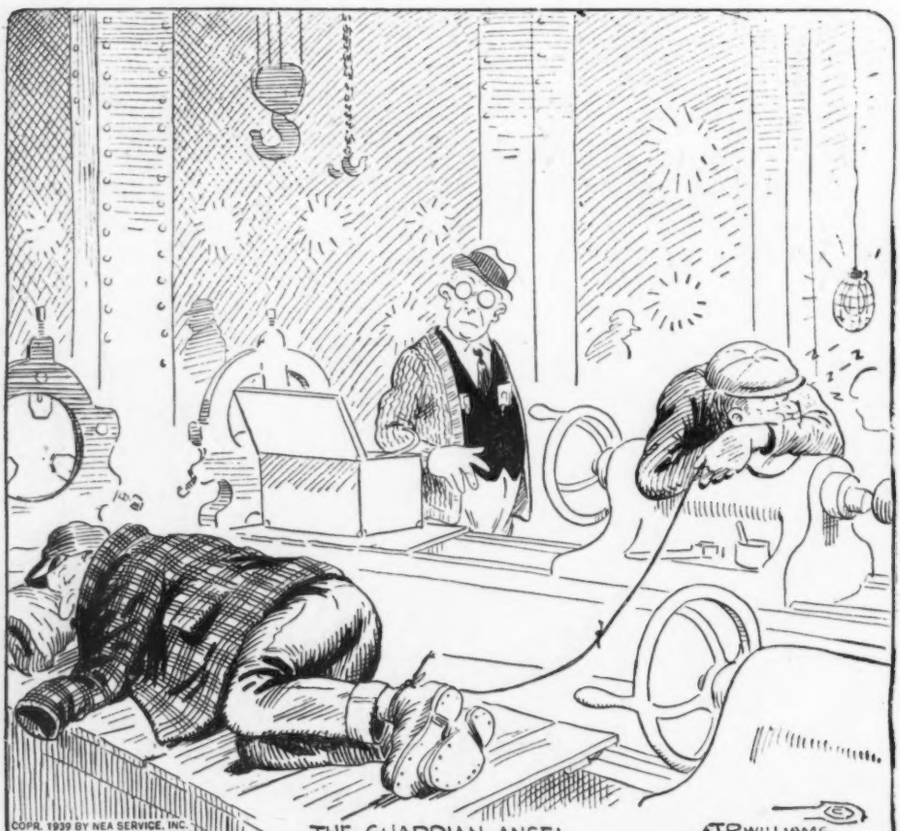
Production in the past week is estimated by Ward's Automotive Reports at 76,685 units, an increase over the 75,215 for the previous week and a broad gain over the 54,084 assembled a year ago. Ward's estimated December production at 412,000 cars and trucks, an advance of more than 18 per cent over December, 1937, and by far the best monthly showing achieved during 1938. At the same time, the total automobile and truck output in the United States and Canada for 1938 was estimated at 2,660,000 units.

In line with the increased production for last week, it is confidently expected that the current week's output will show a very substantial gain. There will be no holidays to subtract from the total so the four-day-a-week shops will get in a full four days compared with three days during the last two weeks. Moreover, Chrysler, which dropped one day a week during the holiday season, is expected to jump back to the five-day schedule. As a matter of fact, it has been pointed out that Chrysler did not reduce its schedule to four days, or 32 hr., at all. Lower production figures were accounted for entirely by the holiday influences.

For the industry as a whole, there may be a 10 to 15 per cent increase in production during the current week. The period just closed showed Chevrolet maintaining output constant at 20,000 units, Lincoln-Zephyr constant at 640, Ford and Mercury gaining from 16,500 in the Christmas week to 17,100 New Year's week. Plymouth made the best showing, with an increase from 8640 to 10,640. January production schedules of Ford, Mercury and Lincoln Zephyr cars call for more than 94,000 units. This is an increase over December and also over January, 1938. Ford's tire plant, which began operations in 1938, opened the new year with production of Ford inner tubes as well as tires.

SYDNEY A. WOODMANCY, new manager of manufacturing at the Oldsmobile Works in Lansing, Mich, has a long and colorful manufacturing background. He has been appointed by C. L. McCUEN, Olds general manager, to succeed J. J. CARTER who has been granted a leave of absence because of ill health and who expects to return to special assignment work with General Motors as soon as his health permits. Woodmancy started his career in 1916 at the Chevrolet plant in Bay City and progressed successively to the positions of foreman, superintendent and manager. He next spent three years as manager of the Chevrolet transmission plant at Toledo. For the last five years he has managed the gear and axle division at Detroit.

THE BULL OF THE WOODS — BY J. R. WILLIAMS



Hand-to-mouth Buying Gains

Some indication of the dullness which made its grip felt during December is given by the accompanying chart of buying trends during that month in Detroit. Hand-to-mouth buying increased to the point where 20 per cent of the Detroit's varied industries were practising it. Another 24 per cent held themselves to a 30-day range and 22 per cent more stayed within the 60-day range. Altogether, 95 per cent of the buying is shown to be within a three-month radius. Still there is enough optimism and enough disregard for the conventions of inventory period to lead 3 per cent of the PA's to look six months ahead, and 1 per cent to plan nine months away.

Assembly Line Notes

Biggest innovation of 1938, Ford's new press shop, part of the $34,000,000 expansion program at the Rouge,

is now in complete operation. This means that almost all Ford body requirements are satisfied at the Rouge. Briggs produce only the Mercury sedan bodies and Murray manufactures a small part of the requirements. * * * Last week's story about the Mullins Mfg. Co. plans to produce bathtubs for Sears, Roebuck & Co. to sell means competition for Briggs' plumbing ware division. Progress will be watched with interest in Detroit. * * * Air lines, preparing to move from the city's airport to less-congested Wayne County airport, are planning erection of several huge hangars which may be part of 1939 structural awards. * * * Toledo has experienced its most peaceful year in labor relations since the enactment of Section 7-A of the NRA. Records of the Industrial Peace Board show only three strikes of importance in 1938. Two have been settled peaceably. One, involving Federal Creosoting Co., outside the city limits, is still in progress. The important point is that many potential disturbances were quietly settled without loss of time or wages.

Metal Cutting Lecture Reprinted

THE address by Hans Ernst on the "Physics of Metal Cutting," one of the educational lectures at the National Metal Congress held under the auspices of the American Society for Metals at Detroit, Oct. 17-21, has been reprinted by the Cincinnati Milling Machine Co., Cincinnati.

A major section of this highly interesting lecture covers study of chip formation under the microscope. It is shown that metal cutting operations produce three basic types of chips. These are: 1, the discontinuous or segmental chip; 2, the continuous chip, with continuously escaping compressed layer adjacent to the tool face; and 3, the continuous chip, with built-up edge adjacent to the tool face. The type (1) chip is most easily disposed of, and the finish of the workpiece is good when the pitch of the segments is small. The type (2) chip is said to be ideal from the standpoint of quality and finish, temperature of tool point and power consumption. With the type (3) chip, commonly encountered in ductile materials, the finish is rough, due to fragments of the built-up edge escaping with the workpiece. The reprinted lecture is well illustrated with photographic reproductions. Mr. Ernst is director of research, Cincinnati Milling Machine & Cincinnati Grinders, Inc.

THE SHEFFIELD REED MECHANISM

THE Sheffield Reed Mechanism and a beam of light are combined in the Visual Gage to furnish industry's most valuable inspection device.

Neither the Reed Mechanism nor the beam of light is vulnerable under ordinary gage operation. Test runs of over 100 million operations show no visible effect.

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THIS WEEK IN WASHINGTON

. . . President Roosevelt in annual message to Congress adroitly weaves international situation and national defense program together, continues his plan of heavy spending for recovery, but offers no new reforms to harass business.

o o o

By L. W. MOFFETT
Resident Washington Editor
The Iron Age

o o o

WASHINGTON — President Roosevelt's annual message to Congress, in which he adroitly wove the international situation and his national defense program with domestic issues and New Deal social aims, reacted more favorably in business circles than have most of his other speeches despite his continued adherence to the hypodermic of large-scale Government spending.

While sentiment in Congress was largely divided along political lines, the stock market reacted favorably and some observers read between the lines that the President was ready to back revision of the Wagner Act. Although this is doubted in other quarters, there were no new reforms listed to harass business and to that extent the speech was interpreted as somewhat more soothing. The belief that business is to be given a breathing spell from a further siege of reform legislation apparently offset the unfavorable reaction toward continuance of a spending spree.

Denies Overburden of Debt

As was the case in his past messages to Congress on the state of the Union, the President talked in generalities. He defended his spending program, subscribed to the Eccles doctrine that abrupt reductions in Government expenditures would be dangerous, denied that the nation is overburdened with debt, and set a total national income of $80,000,000,000 as the Administration's goal.

Among the factors listed by him as necessary to attain that amount were (1) a greater understanding among business men of changes in world conditions and technological improvements and changes of the type by which business men are now educating themselves through the so-called "monopoly investigation" and (2) the perfecting of labor organizations and "a universal ungrudging attitude" by employers toward labor, and acceptance by labor that its welfare depends on increased balanced output of goods.

Although his national defense message was not scheduled to reach Congress until this week, Mr. Roosevelt bore down heavily on dictatorships abroad, contrasted events in Europe with New Deal methods during the past six years, and asked for greater national unity as an essential part of any successful program of national defense. The President called the Administration's program of social and economic reform "a part of defense as basic as armaments themselves."

As for general recommendations, Mr. Roosevelt told Congress that the country looks to the two Houses to improve the machinery set up during the past six years without destroying or impairing its social usefulness. In this connection he mentioned the necessity for ending factional labor strife and employer-employee disputes; solving railroad and other transportation problems; broadening of old-age and sick benefits under the Social Security Act; and reorganizing the Government, the controversial proposal which was defeated by the last Congress.

He suggested that changes are necessary in neutrality legislation but on the subject of increased taxes to take care of unprecedented peace-time expenditures he laid down the vague suggestion that consideration be given to "relatively small tax increases to adjust inequalities without interfering with the aggregate income of the American people."

Urges Continued Spending

Disappointing and disturbing to business were the President's references to what he termed the necessity for continued Government spending at current levels. Taking credit for "our common sense action of resuming Government activities last spring," he told Congress that the action had reversed the recession and that for the moment a drastic curtailment of Government investments could not be logically attempted. He put the responsibility on Congress for determining which New Deal laws and expenditures should be curtailed in the interest of economy.

"We suffer from a great unemployment of capital," the President said in his message delivered in person. "Many people have the idea that as a nation we are overburdened with debt and are spending more than we can afford. That is not so. Despite our Federal Government expenditures the entire debt of our national economic system, public and private together, is no larger today than it was in 1929, and the interest thereon is far less than it was in 1929.

"The object is to put capital—private as well as public—to work.

"We want to get enough capital and labor to give us a total turnover of business, a total national income, of at least $80,000,000,000 a year. At that figure we shall have a substantial reduction of unemployment; and the Federal revenues will be sufficient to

HE WORKS WHERE IT'S MOST CONVENIENT

Close up of the rear controls.

. . . AND PRODUCES MORE

The milling job illustrated consists of squaring the ends of long steel strips. These strips extend several feet in front of the machine — a CINCINNATI No. 4 Dial Type Miller — making it difficult to manipulate the front control levers. Operating the machine from the front is therefore out of the question, but the operator just forgets about this hindrance and moves to the rear control position. A complete set of independent directional control levers at the rear of CINCINNATI High Power and Dial Type Millers, right where the operator is standing in this illustration, overcomes all the hindrances and "blind" cuts from the front.

Catalog M-712 for the CINCINNATI Dial Types, or M-582 for the CINCINNATI 4 and 5 High Powers, will be mailed on request. An interesting folder on job shop and tool room work "Save 15% to 40%" will also be mailed on request.

CINCINNATI

A SYMBOL OF A DEFINITE STANDARD OF WORTH

THE CINCINNATI MILLING MACHINE CO.

Cincinnati, Ohio, U. S. A.

balance the current level of cash expenditures on the basis of the existing tax structure. That figure can be attained, working within the framework of our traditional profit system."

The President's message on the breath-taking $9,000,000,000 1940 budget also pursued the contention that "it would be unwise either to curtail expenditures sharply or to impose drastic new taxes at this stage of recovery." He asked for "moderate" tax increases to raise $422,000,000 to meet a proposed $1,319,558,000 national defense program and an outlay of $533,000,000 for agricultural parity payments, together with $2,266,000,000 for "recovery" and relief. To add to the giddiness produced by these astronomical demands on taxpayers, the President immediately after his budget message, made a request for a supplemental appropriation of $875,000,000 to bolster up, from Feb. 1 to July 1, the politically raided WPA. The figure exceeds by at least one-third the amount that had generally been predicted. Like other huge sums asked for it created rumblings at the Capitol and, faced with the most hostile Congress he has ever encountered, indications are that the President this time will not get all he demanded.

Navy Calls for $270,000,000

The estimate of funds required for construction of naval vessels in the fiscal year 1940 amounts to $270,000,000, an increase of $115,886,850 over the amount appropriated for 1939. This increase provides for continuing construction of vessels already under way and for beginning the construction during 1940 of two battleships, two cruisers, eight destroyers, eight submarines, two seaplane tenders, and one repair shift. It is estimated that the naval vessels proposed for 1940 will require approximately 52,000 tons of plain steel.

The budget also includes $3,545,000 to initiate a program, strongly urged by the Navy Department, for the procurement of a stock of materials to be maintained as a war reserve.

War Budget $515,979,944

The 1940 budget estimates for the War Department, exclusive of items in the general public works program and of trust accounts, amount to $515,979,944, an increase of $9,415,506 over the 1939 appropriation. Among increases made are: $2,000,000 for the replacement of automotive equipment and the purchase of additional automotive equipment for new motorized tactical units of the army; $123,145 increase for the cost of maintenance and repair of arsenals, occasioned by the necessity of replacing unserviceable car equipment; $501,965 increase for sea coast defenses of the United States, Hawaii, and the Panama Canal.

Mr. Roosevelt expressed the firm conviction that the new taxes to meet the enlarged national defense and the agricultural parity programs "should be most carefully selected from the standpoint of avoiding repressive effects upon purchasing power." He recommended re-enactment of the excise taxes which will expire in June and July of this year. He said he did so "not because I regard them as ideal components of our tax structure but their collection has been perfected, our economy is adjusted to them, and we cannot afford at this time to sacrifice the revenue they represent." He said that if the Congress should at this session adopt new taxes more scientifically planned to take care of the defense and agricultural programs, it is quite possible that the existence of these new taxes "will enable us in a later year to give consideration to abolishing some of the present excise levies."

The proposed budget, if adopted, would bring the gross public debt at the end of the 1940 fiscal year to the unprecedented total of $44,458,000,000, an increase of $3,326,343,000 over the estimated gross public debt at the end of the fiscal year 1939. This suggested total is within less than $500,000,000 of the statutory limitation of the public debt. It is reported that the President will ask that the limitation be increased. The estimated receipts for the fiscal year 1940 amount to $5,669,320,000 and expenditures for that year are estimated at $8,995,633,000. The revised estimate of receipts for the fiscal year 1938 is $5,520,070,000 and of expenditures, $9,492,329,000, leaving a deficit of $3,972,259,000.

NLRB Approves Its Own Acts in Report

WASHINGTON—Omitting any recommendations for improving its administration or for changing the Wagner Act, the National Labor Relations Board submitted its annual report to Congress this week, expressed disappointment that no state passed a labor relations law during the past 18 months, patted itself on the back for "the great constitutional decisions" recorded in last year's report, and expressed the view that the Supreme Court will eventually decide pending cases where the board feels the circuit courts have departed from the "well established" principle of permitting quasi-judicial boards to weigh and appraise the evidence in a case.

"In several cases also the circuit courts of appeals have, in the opinion of the board, unduly limited the purposes of the act in the setting aside of remedial orders designed to remedy situations caused by unfair labor practice," the NLRB said. "The board feels confident that final judicial determinations will resolve this problem also."

The report noted that the increase in memberships in both the CIO and the AFL continued throughout the fiscal year ending June 30, 1938, but not at the rate immediately following the Supreme Court decision in the Wagner Act. On the subject of craft unions, the board wrote that generally the wages, hours and working conditions of skilled craftsmen are different from those of other employees of the same employer, and require special treatment in collective bargaining. Hence in several decisions separate appropriate units have been established for specially skilled workers and in others they have been excluded from the unit found to be appropriate for the balance of the company's employees, the report said.

During the third year of the board's existence, most of the litigation was confined to proceedings for the enforcement or review of NLRB orders. Also, a small number of injunction proceedings against the board and its agents, and miscellaneous litigation involving the operations of the agency, continued to be pressed during the year.

1938 Rail Equipment Exports Increased

EXPORTS of railroad equipment for the first 11 months of 1938 were valued at $13,525,035 against $10,372,497 during the corresponding period of 1937, according to the Transportation Division, Department of Commerce.

Heavy Industry Prices Are Puzzling, Arnold Reports

WASHINGTON—Assistant Attorney General Thurman Arnold, the Justice Department's No. 1 trust buster and member of the Temporary National Economic (anti-monopoly) Committee, told Congress in an annual report last week that it would be untimely for him to recommend changes in the anti-trust laws in view of the TNEC's current investigation but that one of the most puzzling problems in anti-trust administration is the problem of price policies in the heavy industries. He advanced a plan for "orderly marketing practices" through which the Government conceivably could exercise more direct influence over prices in industry.

Mr. Arnold referred specifically to the steel industry and cited the increased production volume after the drop in steel prices in substantiation of his contention that the industry over-emphasizes the argument that a reduction in prices does not necessarily yield volume which would make that reduction profitable. He conceded that the argument cannot be ignored and recognized that there is "some merit in the contention."

Orderly Market Practice

The anti-trust division head suggested as a possible way of making price reductions in heavy industries effective "concerted action among enterprises in different industries." This might be brought about, he suggested, by giving approval to "orderly marketing practices" designed to lower prices but meeting these four requirements: (1) addressed to the problems of particular industries; (2) approval for a limited period and a constant check to determine whether the objective of lowering prices and increasing volume was being attained; (3) machinery to penalize abuse of the position created by such approval; and (4) approval in a form permitting ready reference to Congress to correct by revision of the law any erroneous policies growing out of the practice although Mr. Arnold pointed out that "careful and resourceful use of consent decrees" could accomplish much in this direction.

Some observers who have expressed an inherent distrust of the Justice Department's policy with respect to consent decrees see in the statement a potential means for controlling industry to a greater degree than did the NRA.

For price reductions in heavy industries to be effective, Mr. Arnold continued, they should be made in all lines making products going into one article reaching the ultimate consumer. He referred to construction as an example where he said that, since structural steel is a small proportion of a building, a drop in the price of steel may affect the price of the building only slightly.

"Suppose, however, that all of the industries which contribute to housing should bring their prices down together," the Assistant Attorney General wrote. "By this means houses would be brought within the reach of the majority of incomes, and there is no question that greatly increased volume would result."

Another outstanding difficulty of anti-trust law enforcement, Mr. Arnold said, is that confusion of the law exists in almost every concrete industrial situation. He told the Congress that this can be remedied only by presenting factual situations to the courts in a sufficient number of cases to cover our industrial problems. The laws will never be clarified before they are enforced—they will only become clarified afterwards, Mr. Arnold said.

Cites Cement Bids

Lacking in the report was any criticism of identical prices on steel which had been severely criticized in last year's report when Robert H. Jackson, now Solicitor General, was head of the anti-trust division. Mr. Arnold did, however, cite some identical cement bids received by the Procurement Division of the Treasury but only in illustrating his point that "glaring contradictions" sometimes arise when different legislative policies are applied to the same business situation. He referred to a specific instance where he said the Miller-Tydings resale price law and the Sherman Act came to "a head-on collision."

Out of the 21 bids filed, most of which were identical to the last decimal, Mr. Arnold related, one was substantially below the others and the Baltimore dealer receiving the award was later charged with having violated the Maryland Fair Trade Act, a price maintenance statute which dovetails with the Miller-Tydings Act. The latter was jointly sponsored in Congress by Senator Tydings, Democrat, of Maryland.

The jury refused to indict, Mr. Arnold noted, but that doesn't relieve dealers from confusion and apprehension over a law under which dealers cannot make low bids and defend criminal prosecutions at the same time.

Reference to the Miller-Tydings law was the first time since it was placed on the statute books that a Department of Justice official has indicated the Department may seek revision of the law. Mr. Arnold did not specifically indicate the extent to which the Department would go in recommending revision but expressed the view that "legislative reconciliation is necessary," with the Sherman Act.

He reiterated his request for substantial increase in appropriations for the anti-trust division, pointing out that the funds available during the current fiscal year, $780,000, are way out of proportion to those given other agencies of the Government for administering laws whose scope is less than the anti-trust laws.

The division has 97 lawyers on its staff, is attempting to enforce some 30 other major acts, is now carrying on five major anti-trust cases, is concluding two others, and is preparing to institute at least four new ones. It is also carrying on extensive investigations necessary to determine the selection of cases.

Battleship Machinery Orders to Westinghouse

WASHINGTON — Propulsion machinery for the battleships *Indiana* and *Alabama* was awarded last Wednesday by the Navy Department to the Westinghouse Electric & Mfg. Co., at $2,233,924.

The Department also has awarded a contract for aluminum alloy to the Aluminum Co. of America at $582,300 and an electric furnace to the Pittsburgh Lectromelt Furnace Corp., Pittsburgh, at $33,242.

President Roosevelt last Wednesday told the House that the naval expansion program authorized last year will require an additional $36,500,000 before June 30 for hulls, machinery, and ordnance. The President asked that the appropriation be included in the first efficiency bill. The bill will be considered soon by the House Committee on Appropriations. Other awards by the department included the following: boilers, coal-burning equipment, fans and accessories for Norfolk Yard, to Industrial Piping & Engineering Co., Baltimore, $242,395.

Boiler plant improvement for Puget Sound, Wash., Yard, to C. C. Moore & Co., San Francisco, $169,023.

1938 Steel Ingot Production 27,839,261 Tons; Rate 39.79%

PRODUCTION of 3,143,169 gross tons of open-hearth and bessemer steel ingots during December brought output for 1938 to a total of 27,839,261 gross tons, according to the monthly report of the American Iron and Steel Institute.

The total for 1938 was 44 per cent below 1937, when 49,502,907 gross tons were produced, and was the lowest annual production since 1934.

Production in December was about 10 per cent below the November output of 3,572,220 gross tons, but was 113 per cent higher than in December, 1937, when production dropped to 1,473,021 gross tons, the lowest total in the past four years.

During 1938 the steel industry operated at an average of 39.79 per cent of capacity as against 72.38 per cent in 1937. The highest rate recorded last year came in November when operations averaged 62.05 per cent for the month, while the lowest was in June when the rate averaged 28.46 per cent. In 1937, operations reached their peak in April with an average of 90.25 per cent of capacity.

The low point in 1937 was December when operations averaged 25.37 per cent, while in the final month of 1938 the rate was 53 per cent of capacity.

Ingot production averaged 533,933 gross tons per week for the year 1938, as against the 1937 average of 949,423 gross tons per week. The December 1938 average of 711,124 gross tons per week compares with 832,685 gross tons in November and with 333,263 gross tons in December, 1937.

Westinghouse Restores Salary Cuts to 5000

PITTSBURGH — Approximately one-third of 5000 of the employees who recently received a 10 per cent salary cut at Westinghouse Electric & Mfg. Co. have had their pay cut restored, effective Jan. 1. The order affects employees receiving $125 a month or less. The management cited improved business conditions as the reason for the restoration move.

Steel Production to Be Diverted from Mingo Works

PITTSBURGH—Steel production and finishing of sheet and tin bars at Carnegie-Illinois Steel Corp.'s Mingo Junction plant, Mingo Junction, Ohio, is expected to be diverted to other plants of the corporation within the next few months.

The works will not be officially abandoned, but under present conditions and at prevailing operating rates, steel now being made there can be produced more economically elsewhere.

The future official status of Mingo works cannot now be determined as it is not definitely known what factors might arise which would permit continued production of steel there.

The expected cessation of activity at Mingo is further evidence of the steel industry's attempt to lower steel making costs in the face of high taxes, high wage rates and competitive prices.

In keeping with past practice, the steel corporation will place as many workmen as possible elsewhere in the company when conditions dictate the closing down of operations.

Major facilities at Mingo include three blast furnaces, two bessemer converters, and finishing equipment for 416,000 tons annually of sheet and tin bars and 65,000 tons of skelp.

McKee Profits Last Year $7.35 on "B" Shares

CLEVELAND — Net profits of Arthur G. McKee & Co., engineers and contractors, will be approximately $7.35 per share of Class B stock for 1938, according to Robert E. Baker, secretary-treasurer. Approximately 91 per cent of the company's dollar volume during 1938 centered in foreign business and 9 per cent in domestic. Contracts obtained after Nov. 1 almost equaled the total in the 10 months prior to that date. About 87 per cent of last year's total was for the oil refining industry.

Steel Employment Rose By 14,000 in November

MORE than 14,000 employees were added to the payrolls of the steel industry during November, raising the total number employed in the industry to the highest level in eight months, according to the American Iron and Steel Institute.

A total of 450,000 employees were at work in the industry during November, as against 436,000 in October and 551,000 in November, 1937. Total steel payrolls for November, 1938, amounted to $61,054,000, compared with $56,176,000 in the month before and with $62,119,000 in November, 1937.

Employees earned an average of 83.5c. per hr. in November, as against 83.2c. and 81.5c. in November, 1937.

An average of 34.2 hr. per week was worked by wage earners in November, which compares with 31.2 hr. in October and with 27.6 hr. in November, 1937.

PRODUCTION OF OPEN-HEARTH AND BESSEMER STEEL INGOTS
(Reported by Companies Which in 1936 Made 98.29 Per Cent of the Open-Hearth and 100 Per Cent of the Bessemer Ingot Production)

	Reported Production (Gross Tons)		Calculated Production All Companies		Number of Weeks	Per Cent of Capacity
1938	Open-Hearth	Bessemer	Monthly	Weekly		
January	1,604,363	99,991	1,732,764	391,143	4.43	29.15
February	1,550,772	125,493	1,703,726	425,932	4.00	31.74
March	1,822,398	157,737	2,012,406	454,268	4.43	33.85
1st Quarter	4,977,533	383,221	5,448,896	423,709	12.86	31.58
April	1,762,315	131,644	1,925,166	448,757	4.29	33.44
May	1,647,049	130,590	1,806,805	407,857	4.43	30.39
June	1,493,148	118,688	1,638,277	381,883	4.29	28.46
2d Quarter	4,902,512	380,922	5,370,248	412,778	13.01	30.76
1st 6 Months	9,880,045	764,143	10,819,144	418,212	25.87	31.17
July	1,821,815	127,982	1,982,058	448,429	4.42	33.42
August	2,309,306	196,789	2,546,988	574,941	4.43	42.85
September	2,407,233	207,887	2,657,748	620,969	4.28	46.28
3d Quarter	6,538,354	532,658	7,186,794	547,357	13.13	40.79
9 Months	16,418,399	1,296,801	18,005,938	461,691	39.00	34.41
October	2,844,358	223,208	3,117,934	703,823	4.43	52.45
November	3,312,319	201,246	3,572,220	832,685	4.29	62.05
December	2,932,279	158,965	3,143,169	711,124	4.42	53.00
4th Quarter	9,088,956	583,419	9,833,323	748,350	13.14	55.77
Total	25,507,355	1,880,220	27,839,261	533,933	52.14	39.79

If you have your own press equipment, let us quote on your die requirements . . . We have a large, modern equipped die department.

A Memo THAT WILL BE MADE MANY TIMES THIS YEAR

• In competitive 1939, more firms than ever will redesign and streamline their products.

In so doing, they will look for a pressed steel organization that can tackle their intricate problems and produce, economically, a part that is lighter and just as strong—with greater sales appeal and less machining.

To these firms this penciled memo will serve as a timely suggestion.

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Men Over 40 Are More Numerous in Industry

WASHINGTON—The National Association of Manufacturers reported to the Secretary of Labor early this week that the proportion of workers over 40 in industrial employment today is greater than before the depression.

Basing its figures on the results of questionnaires compiled from 2485 industrial units employing more than 2,000,000 workers, the association reported that less than 1 per cent of the companies indicated they give preference to younger workers; that no companies discharge workers when they reach 40, that 89.1 per cent of the companies have no maximum hiring age limit, but that 38.3 per cent of the companies give preference in hiring workers below 40 because of training and apprenticeship requirements and physical demands made by certain jobs.

The figures also indicated a slight decrease in industrial employment after age 50, but showed that a substantial portion of employees hired in 1938 were 40 or over.

Stream Pollution Bills Introduced in Congress

WASHINGTON — Two stream pollution control bills of the type to which industry has not raised serious objections and embodying substantially the same provisions as the old Barkley-Vinson bill which passed both Houses last session, have been introduced in the House of Representatives.

The two bills, which are identical, have been introduced by Representatives Spence of Kentucky and Parsons of Illinois, both Democrats. A third bill, following substantially along the same lines, is expected to be sponsored by Representative Bland, Democrat of Virginia, and will be given right-of-way over the other two.

President Roosevelt vetoed the Barkley-Vinson bill last session on the grounds that the method prescribed for dispersing the funds was contrary to the policy established by the Administration.

Government Buying For Latest Week

WASHINGTON — Awards for iron and steel products under the Walsh-Healey Act during the week ended Dec. 31 totaled $875,986.56, while contracts for machinery amounted to $292,266.40. Details respecting these and related awards follow:

IRON, STEEL AND THEIR PRODUCTS

Erie Forge Co., Erie, Pa., House forgings	$143,990.86
Struthers Wells-Titusville Corp., Titusville Forge Div., Titusville, Pa., forgings	88,104.54
Penna. Forge Corp., Philadelphia, forgings	44,583.00
Allis-Chalmers Mfg. Co., Milwaukee, forgings	43,786.90
U. S. Pipe & Foundry Co., New York, pipe and fittings	11,744.08
Steel & Tubes, Inc., Cleveland, steel pipe	70,747.36
Henry Vogt Machine Co., Louisville, Ky., valves, tubing	8,515.90
Bethlehem Steel Co., San Francisco, steel bars	214,260.00
Bethlehem Steel Co., San Francisco, steel bars	194,090.88
The Hotstream Heater Co., Cleveland, water heaters	14,332.00
Mitchell Metal Products, Inc., Cleveland, packing boxes	29,800.00
National Tube Co., New York, flasks, caps and gaskets	12,031.04

LA SALLE'S *NEW* BAR STEEL

No Heat Treating!
No Case Hardening!
No Warpage After Machining!

STRESSPROOF No. 2

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WORM SHAFT

Machined at 165 S.F.P.M. Absolutely no warpage.

STOKER SHAFT

After 2265 hour test with 50% overload, teeth show no wear.

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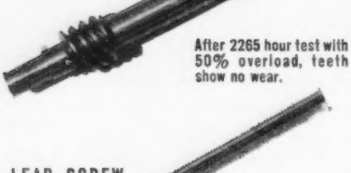

One user reports total variance of lead of only .0004".

● Parts made from STRESSPROOF No. 2 are ready for service following the last machining operation because as received by you, STRESSPROOF No. 2 has a minimum yield point of 100,000 lbs. per sq. in.; unique wearability and freedom from warpage.

● STRESSPROOF No. 2 is not presented as the full equal to heat treated alloy steel or a case hardened steel but laboratory tests, production tests and the experience of hundreds of users have proven that it will satisfactorily serve for numerous applications now produced from heat treated or case hardened steels.

● STRESSPROOF No. 2 is priced lower than any other high strength Cold Finished steel bar, has *80% the machinability of Bessemer Screw stock* . . . and worthwhile savings must result wherever it is applicable.

● Write . . . or return the coupon below . . . for descriptive booklet which will help you determine if you, too, can make savings through the use of this new steel. La Salle Steel Company, Dept. 1-D, Box 6800-A, Chicago.

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Cold Finished Carbon and Alloy Steel Bars and Shafting—Furnace Treated Bars

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Please send me booklet describing your new steel STRESSPROOF No. 2.
Name_____ Title_____
Firm_____ Address_____
Also send to_____

NONFERROUS METALS AND ALLOYS

Nathan Trotter & Co., Philadelphia, pig lead	11,640.00

OTHER MACHINERY

Fairbanks, Morse & Co., New York, marine diesel engine	43,233.00
Hendrie & Bolthoff Mfg. & Supply Co., Denver, boring mill	46,000.00
Niles-Bement-Pont Co., Pratt & Whitney Div., Hartford, Conn., profilers	50,870.00
W. E. Shipley Machinery Co., Philadelphia, boring machines	41,751.00
Gisholt Machine Co., Madison, Wis., lathes	50,981.00
Lehmann Machine Co., St. Louis, lathes	11,155.40
Bay City Shovels, Inc., Bay City, Mich., dragline excavator	14,500.00
Northern Pump Co., Minneapolis, pumps	33,776.00

Europe Using More Chrome-Magnesite For Furnace Roofs

LEWIS B. LINDEMUTH, New York, consultant for steel production, who has just returned from England and the Continent, considers that the recent Austrian development of a chrome-magnesite brick for open-hearth furnace roofs, ports and uptakes, is the most important single advancement of open hearth furnaces for many years. Last year he visited Germany and Austria to study this development and this fall he again went to Austria to see the latest improvements.

Having been closely involved in the design, erection and operating of two large furnaces with basic roofs, his observations are that the slag pockets and checkers seriously limit the economies which otherwise could be realized from those new refractories.

With this in view, he last year designed a 175-ton furnace with several novel features which are expected to permit a continuous run of at least two years from the checkers to correspond with a similarly expected life from the roofs. This furnace has been built, but not, at this time, with a chrome-magnesite roof.

He considers it important that all furnaces, now being built or projected, should take into account the probable change in the near future to basic refractories, so that provision can be made for such a change, without interfering with the immediate operation as a silica refractory furnace.

Mr. Lindemuth expects to leave New York soon for Australia.

Steel Fabricators Oppose Continued Deficit Spending

CALLING attention to a resolution adopted at the convention of the American Institute of Steel Construction last October, V. G. Iden, secretary of that organization, has addressed a letter to Senator Pat Harrison, chairman of the House Ways and Means Committee, protesting against continued deficit spending by the Government, which, it is stated, has greatly retarded the recovery of the construction industry.

"Deficit financing and heavy taxation," said the association's resolution, "both tend to curtail investments and extensions. While these conditions prevail there will continue to be hesitancy on the part of owners to put money into new structures. This is injurious to the prospects of the steel construction industry and those dependent upon it."

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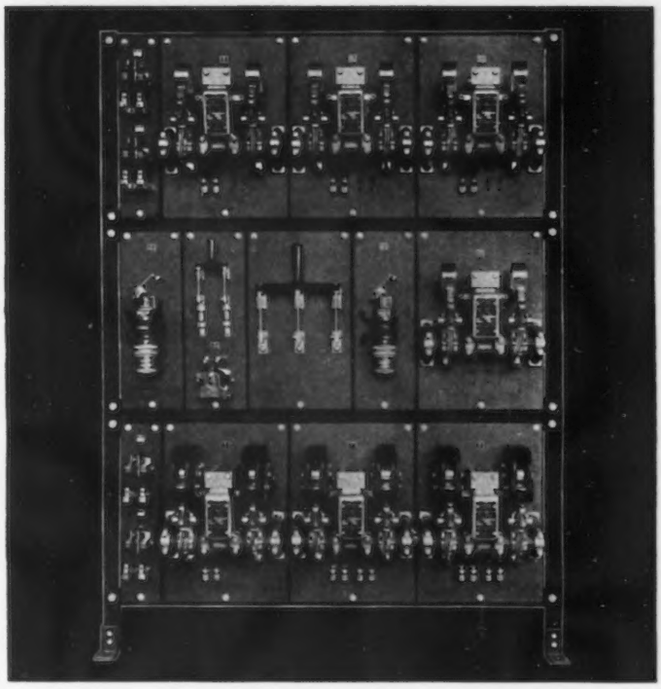

EC&M Frequency Relay Magnetic Control provides a new, efficient method of controlling A.C. Wound Rotor Motors used on Cranes, Table Drives, Transfers, Coke Pushers, Shears, Wire-Drawing Machinery, etc. The important fact is that this control exactly matches the requirement for maintaining the carefully pre-selected values of torque for bringing the load up to speed. Smooth, efficient acceleration is thus obtained by accurate control of motor torque throughout the entire starting period. Send for further information.

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HEAVY DUTY MOTOR CONTROL FOR CRANES, MILL DRIVES AND MACHINERY • BRAKES • LIMIT STOPS • LIFTING MAGNETS AND AUTOMATIC WELD TIMERS

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Supplies of No. 1 Steel Scrap Decreasing; No. 2 Gaining Volume

POINTING to the possibility that No. 2 heavy melting steel scrap may ultimately displace No. 1 heavy melting steel to a large extent in usage by steel companies, Edwin C. Barringer, executive secretary of the Institute of Scrap Iron and Steel, told the institute members at their convention in St. Louis this week that changing trends in the manufacture of steel may bring about this situation.

Mr. Barringer ascribed the changing trend to two principal factors: 1, The increasing percentage of the light steels of the total volume of finished steel production, and, 2, the decreasing proportion (on an actual tonnage basis) of the heavy steels.

Citing the growth of light steels in the past decade, Mr. Barringer pointed out that in 1928 these represented about 46 per cent of total finished steel output, while in 1931, the first year of the depression period, they had climbed to 51 per cent; in 1932 light steels were 58 per cent, in 1933 they were 63 per cent, and since that time they have made up between 58 and 62 per cent.

Heavy Steels Decline

Correspondingly, heavy steel production fell off both in terms of percentage and total tonnage. For example, rails dropped from 2,700,000 tons in 1929 to 1,450,000 tons in 1937, although total steel production in 1937 was only 10 per cent below that of 1929. Plates fell off from about 5,000,000 tons in 1929 to 3,200,000 in 1937 and structural shapes declined from 4,800,000 tons in 1929 to 3,300,000 tons in 1937.

A survey of typical brokers and dealers by the institute showed, Mr. Barringer said, that there has been a marked shrinkage in the proportion of No. 1 heavy melting steel handled in relation to No. 2 steel. Only a decade ago No. 1 heavy melting steel was about 60 per cent of all steel scrap handled, while today the proportion is reversed, the No. 2 grade comprising 60 to 65 per cent of the melting steel that is sold. "This may suggest," he said, "that No. 1 heavy melting steel is slipping in its role as bellwether of scrap prices, and in the future consideration may well be given by compilers of composite prices to greater recognition of the lighter grades."

Most of the light steel scrap returns to the mills in a comparatively short time, while heavy steel sometimes does not again appear as scrap for decades. The automobile industry, which uses 20 to 25 per cent of the finished steel produced, turns out a product whose average life is but seven or eight years. Other consumer goods, it was said, probably average little more than 10 years of life. The junking of automobiles has become one of the principal sources of steel scrap and the automobile industry as a whole has for some years replaced the railroads as the principal source of old material.

Scrap From Old Automobiles

"It is estimated," said Mr. Barringer, "that in 1938 2,500,000 old automobiles were junked. On the average each of these junked models yielded about 400 lb. of cast iron in the motor block, 75 lb. of other gray iron scrap, 125 lb. of malleable scrap, 600 lb. of No. 2 steel in the frame, bumpers, axles, etc., and 700 lb. of sheet metal scrap in the body, fenders and other parts—a great majority of which is raw material for the balers—and about 50 lb. of miscellaneous material, or a total of 1950 lb. per car. Thus, for the 2,500,000 cars junked in 1938 the ferrous scrap yield was 2,437,500 tons. It should be understood that, on the average, cars now being junked are of the vintage of 1930 or 1931 and that as obsolescence overtakes later models the yield per car will be measurably higher because of the increased use of steel in bodies and the declining proportion of non-ferrous metals. Also, that wrecking yards in and near large cities handle more trucks and heavier passenger cars than those in rural areas.

"In the processes of manufacturing 2,600,000 new cars in 1938 about 800 lb. of scrap per car was generated, or approximately 1,040,000 tons of borings, turnings, sheet clips and other grades of scrap. This includes scrap from part makers as well as automobile assemblers. Thus, the total of scrap from junking operations and from the processes of manufacture in 1938 was approximately 3,477,500 tons.

"Meanwhile, for the production of these 2,600,000 new models, automobile manufacturers in 1938 purchased approximately 2800 lb. of steel and 600 lb. of iron per car, making their aggregate new iron and steel requirements 4,400,000 tons. In other words, for every 10 tons of new iron and steel that the automotive industry purchased, it was responsible for the production of practically eight tons of scrap, directly or indirectly.

"A searching analysis of the relationship of automobile manufacturers' requirements for new steel, the values in scrap resulting from junking operations, and the factor of highway safety might prove profitable.

"Assume that in 1939 the automobile industry experiences a 20 per cent increase over 1938 and assembles about 3,100,000 models. This would make new steel requirements approximately 5,200,000 tons. On the basis of 800 lb. of scrap resulting from manufacturing operations, the new scrap yield would be approximately 1,240,000 tons. If some tie-up could be made, possibly through a drive to eliminate dangerous and obsolete cars from the highways, and 3,000,000 old models were forced to the junk heap, the resulting scrap yield would be approximately 2,925,000 tons, which added to the 1,240,000 tons of new scrap from manufacturing processes, would, at least on paper, make the automotive industry 80 per cent self-sustaining in the matter of steel. It goes without saying that the scrap industry is ready to cooperate with any reasonable program that might be

TABLE I

	Domestic Consumption of Scrap (Gross tons)	No. of Autos Scrapped	Yield of Scrap From Auto Wrecking (Gross tons)	Exports of Scrap (Gross tons)
1938*	19,000,000	2,500,000	2,437,500	3,200,000
1937	38,006,272	2,700,000	2,632,500	4,039,000
1936	36,358,133	2,400,000	2,340,000	1,877,000
1935	26,415,330	2,200,000	2,145,000	2,044,000
1934	Not compiled	1,700,000	1,657,500	1,835,000
1933	Not compiled	1,650,000	1,608,750	773,000
1932	Not compiled	1,250,000	1,218,750	227,000
			14,040,000	13,995,000

*Estimated.

evolved from a joint study of steel requirements and highway safety.

"Another measure of the conservation and safety value in the junking of old automobiles is a comparison of the yield of scrap from wrecking yards with total exports of scrap. Since 1932, the first year in which exports assumed sizable proportions, a total of 13,995,000 tons of ferrous scrap has been shipped abroad. But in the same period, automobile wrecking yards produced 14,040,000 tons of scrap. In other words, it can be said that all exports of scrap in the past seven years have represented the elimination of obsolete and unsafe vehicles from the highways, and as a matter of fact, a large proportion of exports has consisted of No. 2 bundles and No. 2 steel arising from junking operations. In Table 1 is a comparison of domestic consumption of scrap, the volume of automobile wrecking operations, and exports.

"Major emphasis has been placed in this study on the automotive industry for the reason that it is the leading factor both in point of production and consumption of scrap and is playing an important role in the accelerated ascendency of the lighter forms of scrap. But each year, as an increasing proportion of the output of the steel mills is absorbed by consumers' goods other than automobiles, such as steel furniture, shelving, and electric refrigerators.

"There may be, at times, a surge of heavy material. For example, it is possible that a solution of the railroad situation will be attempted by a series of consolidations and the abandonment of parallel facilities which might put on the market large tonnages of heavy scrap. A program to scrap several hundred thousand freight cars to be replaced by lighter equipment also has been under consideration and might mature. But it appears safe to assume that, on the whole, the trend is irresistible, especially considering that steel producers who are supposed to have a long view are concentrating their expenditures for new equipment on facilities for rolling the lighter forms of steel, which in turn come on to the scrap market as the lighter forms of scrap.

"It is obvious that the scrap trade itself is only a processor and its function is to prepare and market in the most economical manner the kind of scrap that obsolescence and replacement make available. Hence this transition in the classification of scrap is also a major problem for the producers of steel, and an adaptation of their operations for continued economical use of scrap will be seen to be increasingly necessary."

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. . . THE NEWS IN BRIEF . . .

Standards proposed for welding fitting.—**Page 21.**

American Rolling Mill Co. reduced accidents among its employees by 54 per cent during 1938.—**Page 21.**

Demonstrates built-up edge on cutting tools.—**Page 25.**

Metallurgist demonstrates built-up edge on cutting tools by high-speed motion pictures taken in laboratory of Jones & Laughlin Steel Corp.—**Page 25.**

Inland Steel Co. honors founders in ceremony of lighting new 1000-ton blast furnace which completes extensive modernization program. —**Page 40.**

Automobile production gains slightly after holidays. Outlook is encouraging.—**Page 42.**

Lectures at the National Metal Congress, held under the auspices of the American Society for Metals, reprinted.—**Page 45.**

President Roosevelt's annual message to Congress proposes no new reforms to harass business, but staggers country with its recommendation for continued heavy spending.—**Page 46.**

Labor Board approves its own acts in report and makes no recommendations for change in act or administration.—**Page 48.**

Exports of railroad equipment during the first 11 months of 1938 topped the corresponding period of 1937. —**Page 48.**

Battleship machinery orders of $2,233,924 to Westinghouse.—**Page 49.**

Heavy industry price policies is one of most puzzling problems of anti-trust administration, Thurman Arnold finds.—**Page 49.**

Steel production in 1938 was 27,839,261 tons, rate for year 39.79 per cent. December output at 53 per cent.—**Page 50.**

Steel production to be diverted from Mingo works to other plants of Carnegie-Illinois Steel Corp.—**Page 50.**

Westinghouse Electric & Mfg. Co. restores salary cuts to about 5000 employees.—**Page 50.**

Arthur G. McKee & Co., Cleveland engineering and contracting firm, earns $7.55 per share of "B" stock in 1938.—**Page 50.**

Employment in the steel industry increased by more than 14,000 in November, according to American Iron and Steel Institute.—**Page 50.**

Men over 40 are more numerous in industry, according to a survey by National Association of Manufacturers.—**Page 52.**

Stream pollution bills are again introduced in Congress.—**Page 52.**

Awards for iron and steel products by the Federal Government in the latest reported week totaled $875,986.—**Page 52.**

American Institute of Steel Construction, addressing chairmen of House Ways and Means Committee, opposes continued deficit spending by the Government.—**Page 53.**

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MEETINGS

Feb. 9 to 11—Conference of iron, steel and allied industries, Del Monte, Cal.

Feb. 14 to 17—Purchasing Agents Association, Indianapolis.

April 26 to 29—Electrochemical Society, Columbus, Ohio.

Europe using more chrome-magnesite brick for furnace roofs, says Lewis B. Lindemuth, engineer. —**Page 53.**

Supplies of No. 1 heavy melting steel are decreasing while volume of No. 2 steel scrap is increasing, says Edwin C. Barringer, executive secretary of Institute of Scrap Iron and Steel.—**Page 54.**

New Pittsburgh company to make complete line of stoves.—**Page 58.**

International Harvester Co. to spend millions on modernization of its plant at Rock Island, Ill.—**Page 58.**

Aluminum & Magnesium Co. is organized by Cleveland group for reclamation of aluminum.—**Page 58.**

Volume of railway purchases in 1938 totaled $380,000,000, smallest in all except two years of the depression.—**Page 58.**

Market for 1,500,000 electric refrigerators and 360,000 electric ranges seen for 1939 by Westinghouse vice-president.—**Page 58.**

SWOC stages a dues collecting drive at Donora plant of American Steel & Wire Co.—**Page 59.**

General Motors sales in December 187,909 cars and trucks.—**Page 59.**

Bill proposes licensing of pig iron and scrap exports.—**Page 59.**

Government steel awards in 1938 totaled $63,002,931.—**Page 59.**

British company to install Mesta strip mill.—**Page 62.**

Capital goods output lowest since 1934, according to THE IRON AGE index.—**Page 64.**

General Electric sales lower in quarter and year.—**Page 73.**

General Motors to build new diesel engine for Chevrolet trucks.—**Page 73.**

Foundry conference to be held in Milwaukee Feb. 16-17.—**Page 74.**

McKeesport Tin Plate Co.'s workers return while wages are under negotiation.—**Page 74.**

S.A.E. holding its annual meeting in Detroit this week.—**Page 76.**

Increase in volume of machine tool inquiries points to more active business. Foreign orders and U. S. ordnance work furnish bulk of current buying.—**Page 84.**

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Too often the efficiency and production costs of operating machine tools are taken for granted as satisfactory. Consideration is not given the fact that competitors may have a cost advantage due to more up-to-date equipment.

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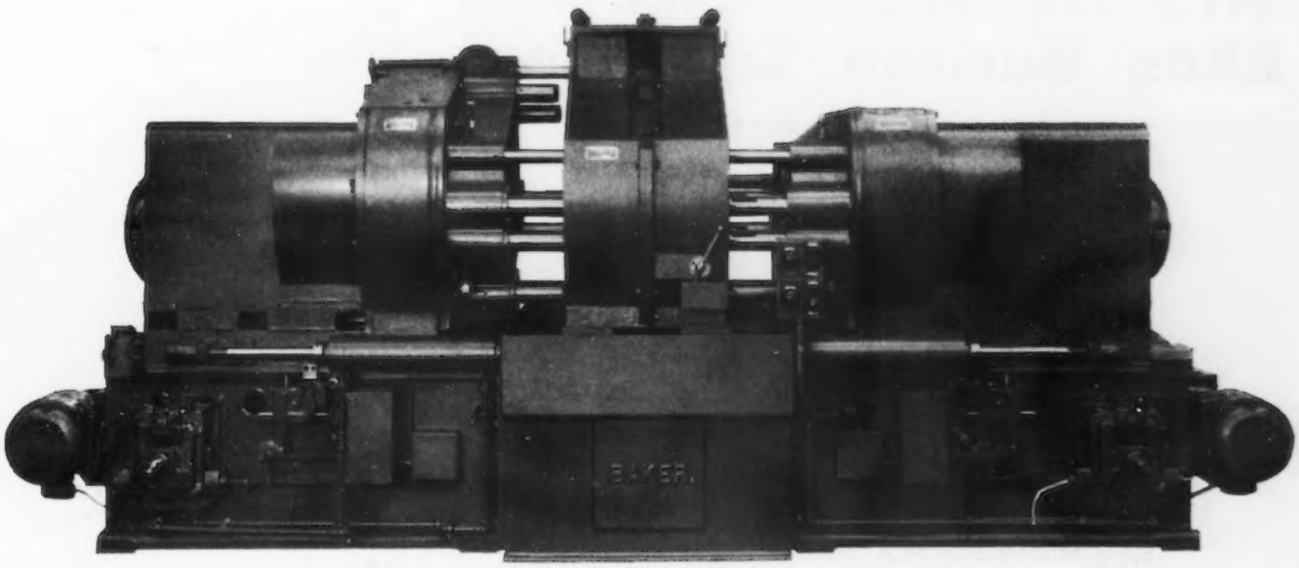

No. 30-HH Baker two way horizontal hydraulic feed—two multiple heads—hand indexing to five stations—each cycle two parts drilled, core drilled and chamfered, rough reamed, and line reamed from one side.

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1,500,000 Refrigerator Market Seen in 1939

ACCORDING to an estimate made by F. B. Williams, Jr., vice-president of Westinghouse Electric & Mfg. Co., 1,500,000 electric refrigerators and 360,000 electric ranges will be sold in 1939. The manufacture of such a volume will provide 85,000,000 man-hours of work. Speaking at the preview of the new Westinghouse line at the Waldorf-Astoria Hotel in New York on Jan. 5, Mr. Williams emphasized the important part played by inventories in this optimistic view of the industry's future. At this time last year, he said, there were about 600,000 1937 model refrigerators in manufacturers' and distributers' stocks which had to be sold during 1938 at reduced prices.

The situation today, he declared, was entirely different. The best estimate of the number of 1938 refrigerators in factory and distributers' stocks was 120,000, about one-fifth of the 1937 surplus. This surplus, he said, represented no problem in any one locality, and should readily be absorbed by the market without disturbing the 1939 model sales.

International Harvester Co. To Spend Millions on Plants

CHICAGO — The International Harvester Co. will spend several million dollars on an extensive program of rehabilitation, modernization and construction at Farmall tractor works, Rock Island, Ill., in 1939. It is planned to rehabilitate existing machinery and to purchase considerable new machinery. Plant assembly and production lines will be redesigned for greater efficiency, and a substantial factory addition will be erected. No immediate increase in employment is contemplated, but company officials state that by 1940, if business is good, employment probably will exceed the maximum of about 5000 established in 1937.

Railroad Buying Halved in 1938

PURCHASES of railway materials used principally in maintenance amounted in 1938 to $340,000,000, the smallest in any year of the depression except 1932 and 1933, but about 27 per cent larger than in those years, according to *Railway Age*.

This increase in purchases over 1932 and 1933 is accounted for principally by an advance of about 20 per cent in prices. Purchases of materials in 1937 were $697,402,000. Orders for equipment in 1938 amounted to about $54,000,000, against $173,320,000 in 1937.

The railway publication reported locomotives ordered in 1938 at 228, compared with 533 in 1936 and 368 in 1937 while freight cars ordered dropped from 67,544 in 1936 and 52,738 in 1937 to 16,539 in 1938 and passenger cars ordered declined from 829 in 1937 to 269 in 1938. Total new mileage built last year was 38, the smallest on record except in 1933. Miles abandoned totaled 1897.

Aluminum & Magnesium Co. Organized at Cleveland

CLEVELAND — Aluminum & Magnesium Co., newly formed by a group of Clevelanders for the reclamation of aluminum, has leased a plant formerly occupied by Bagdad Copper Products Co. on the property of M. H. Millspaugh at Sandusky. President of the new company is J. G. Frost; vice president, Edmund Christiansen, and secretary-treasurer, Hugh M. Simpson.

New Pittsburgh Company to Make Complete Line of Stoves

PITTSBURGH — A Pittsburgh Commission for Industrial Expansion has been responsible for the establishment of a new manufacturing plant known as the Pittsburgh Range & Heater Co. The company will have a complete line of stoves.

P. W. Aitkenhead heads the firm, which has offices and a plant on the north side of this city. L. G. McClintock is vice-president and R. C. Aitkenhead, secretary-treasurer.

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Bill Proposes Licensing of Pig Iron and Scrap Exports

WASHINGTON — Representative Crawford, Republican of Michigan, the first to introduce a scrap licensing bill after the 76th Congress convened, proposed in his measure that exports of pig iron, scrap iron and scrap steel be restricted except under license issued by the Secretary of Commerce.

The Congressman also introduced a joint resolution under which the President would be required, when declaring an embargo on arms and ammunition exports, to also include scrap iron and pig iron.

General Motors Sales in December 187,909 Units

DECEMBER sales of General Motors cars and trucks from all sources of manufacture totaled 187,909 compared with 160,444 in December a year ago. Sales in November were 200,256. Sales for 1938 totaled 1,307,749 compared with 2,116,897 in 1937.

Government Steel Awards in 1938 Totaled $63,002,931

WASHINGTON—Iron and steel awards under the Walsh-Healey Act at the conclusion of 1938 numbered 1177, valued at $63,002,931.86, or 9.01 per cent of the total of 11,614, valued at $699,114,343, according to an announcement by Secretary of Labor Frances Perkins. Other awards by number and value were: Transportation equipment (which led the list), 775, $135,822,588.06; electrical apparatus, 788, $47,878,487.29; machinery, 1053, $46,445,474.34; nonferrous metals and alloys, 312, $14,076,985.38.

SWOC Stages Dues Drive At Steel & Wire Plant

DONORA, PA.—Dues collecting activities of the SWOC flared into the open here last week and caused some disturbances at the plant of the American Steel & Wire Co., a U. S. Steel Corp. subsidiary. The collecting campaign lasted only a day and some employees who had not paid their dues were turned back in the same manner as in recent dues collecting drives at Pittsburgh. No comment was forthcoming from either the company or SWOC national headquarters, although a local labor leader declared the drive "a local affair."

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. . . OBITUARY . . .

R. H. IRONS, president of the Central Iron & Steel Co., Harrisburg, Pa., died of toxic poisoning at the International Hospital in Naples, Italy, on Jan. 5, aged 62 years. He was not well when he left New York on Dec. 1. He was born at Halifax, north of Harrisburg, and entered the South Harrisburg mills of the Central Iron & Steel Co. when he was 16 years old. He was promoted from one position to another until in 1912 he was made general superintendent of the plant. He was made president of the company in 1916. He was a member of the American Iron and Steel Institute and of the American Institute of Mining and Metallurgical Engineers.

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WILLIAM ROBBINS SEIGLE, chairman of the board of directors, vice-president and director of research of Johns-Manville Corp., died at St. Mary's Hospital, Rochester, Minn., on Dec. 6, aged 59 years. He had been with the company for nearly 40 years, having begun at the bottom in 1899 with the old H. W. Johns Mfg. Co. He became vice-president of the Johns-Manville Company in charge of factories and mines in 1917 and became chairman of the board in 1929.

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JOHN T. RONAN, president of the Diamond Saw & Stamping Works, Inc., Buffalo, died on Dec. 21. He helped found the company 40 years ago.

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DR. PORTER W. SHIMER, consulting metallurgical engineer and at one time chief chemist of the old Thomas Iron Co., died at his home in Easton, Pa., on Dec. 7, aged 81 years. He was graduated from Lafayette College in 1878. A son, W. Robert Shimer, is metallurgical engineer for Bethlehem Steel Co., and another son, Edward B. Shimer, is chemical engineer in Easton, Pa.

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FRANK F. JACKSON, vice-president and treasurer, Standard Alloy Co., Cleveland, died Jan. 3, in Clearwater, Fla., at the age of 44. He had been associated with the company 11 years.

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RUSSELL B. TEWKSBURY, chairman of the board and former president of Oster Mfg. Co., Cleveland, died Dec. 31, in Sarasota, Fla., aged 79 years. He had been in poor health for several years. In 1893, Mr. Tewksbury helped found the company, which manufactures machines and tools. He assumed the presidency in 1898.

R. H. IRONS

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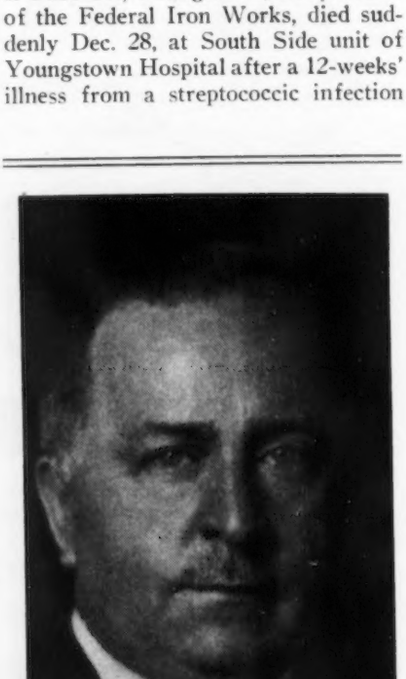
FRED C. DUSTMAN, superintendent of the tube mill of Youngstown Sheet & Tube Co., Youngstown, and director of the Federal Iron Works, died suddenly Dec. 28, at South Side unit of Youngstown Hospital after a 12-weeks' illness from a streptococcic infection of the throat. Mr. Dustman, who was 47, had been with the Sheet & Tube Company for 30 years.



W. R. SEIGLE

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SAMUEL W. MEALS, aged 69, president, Carnegie Natural Gas Co., Pittsburgh, a U. S. Steel Corp. subsidiary, died at his home in Pittsburgh, Jan. 4. He had been associated with the Carnegie Natural Gas Co. for 34 years, having been president since 1921. Mr. Meals formerly was connected with the South Penn Oil Co. in West Virginia and Pennsylvania.

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CHARLES B. BUERGER, aged 58, vice-president of the Gulf Oil Corp., Pittsburgh, died at his home in Pittsburgh, Jan. 3. He went to Pittsburgh in 1922 as assistant to the vice-president of the Gulf Corp., and was appointed vice-president in 1928. Prior to this Mr. Buerger conducted engineering researches in petroleum refining.

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WILLIAM FREDERICK ROBERTSON, founder and president of the W. F. Robertson Steel & Iron Co., Cincinnati and Springfield, Ohio, died at his Cincinnati home, Dec. 20. He was 77 years old. Mr. Robertson was widely known in the steel and wire business and also held the presidencies of H. L. Brown Fence & Mfg. Co., Cincinnati, and Tower Mfg. Co., Madison, Ind. Always active in civic and business affairs, Mr. Robertson was also a founder of the Cincinnati Manufacturers Club.

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JAMES S. BRADSHAW, assistant to Frank J. O'Brien, president and general manager of the Globe Steel Tubes Co., Milwaukee, died on Jan. 3, aged 54 years. He was born in Superior, Wis., and following graduation from the United States Military Academy at West Point, saw service in the Philippine Islands after the war with Spain. He joined the Globe Company in 1923.

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GEORGE W. JAHN, assistant to chief engineer, Gary Sheet and Tin Mills of Carnegie-Illinois Steel Corp., died last week in Gary, aged 64 years. He had been in poor health for the past two years. Mr. Jahn had been with the corporation since 1904 when he started as a line foreman in the electrical department at South works. In 1910 he was transferred to the sheet and tin mills where he served as master mechanic, resident engineer and assis-

tant to chief engineer, the position he held at the time of his death.

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ERNEST A. NELSON, an engineer for the Dodge Division of the Chrysler Corp., was buried Dec. 23. He was 42 years old.

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ALEX RIACH, 51 years old, an engineer for the Murray Body Co. for 15 years in Detroit, was buried Dec. 27.

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HARRY M. LEWIS, president of the National Tool Salvage Co., died Dec. 28 of a heart attack at his home in Royal Oak, Mich. He was 50 years old.

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AUGUST L. VALENTINE, mechanical engineer, who retired in 1936 after 15 years service in Gothenburg, Sweden, died Jan. 3, at his home in Wellesley Hills, Mass. Mr. Valentine was born near Stockholm, Sweden, Feb. 14, 1875, and came to this country after graduating from college in 1892. Subsequently he was associated with the Pratt & Whitney Co., Hartford, Conn. After the war he went to France where he constructed a tool manufacturing plant for the Societe Anonyme Curial outside Paris. In 1922, he went to Gothenburg and founded a division of the Swedish Ball Bearing Co.

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N. PHILLIP LORD, production manager of the Spencer Turbine Co., Hartford, Conn., died of pneumonia at a hospital in that city on Jan. 4. Mr. Lord was born at Windsor Locks, Conn., 39 years ago and received his education in the public schools there, at the Loomis Institute in Windsor, and Connecticut State College in Storrs, Conn. He became associated with the Spencer Turbine Co. in 1926.

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BERNARD E. FAHEY, vice-president of the Jackson & Fahey Co., Milwaukee, sales engineer, died on Jan. 3, aged 52 years. He was a lifelong resident of Milwaukee. The firm is distributer of Fenestra steel sash, Kinnear rolling doors, Security freight elevator doors and other steel building products.

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FREDERICK J. OSIUS, pioneer industrialist of Racine, Wis., died at his present home in Miami Beach, Fla., on Jan. 5, aged 69 years. He founded the Standard Mfg. Co., now the Hamilton-Beach Co., in 1910, to manufacture fractional horsepower motors and electric appliances. Mr. Osius is credited with originating the vacuum cleaner.

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FREDERICK W. MARQUARDT, former operator of the Ornamental Iron & Wire Works, Detroit, and an old-time baseball player, was buried Dec. 31. Mr. Marquardt, born in Detroit, 70 years ago, retired from active business in 1918.

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LAWRENCE J. BONDY, 45-year-old engineer at the Hudson Motor Car Co., Detroit, was buried Jan. 3.

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BYRON R. RICHARDSON, superintendent of the Canton, Ohio, steel division of Republic Steel Corp., died Dec. 16 from a heart attack while driving to work. After graduation from the University of Indiana Mr. Richardson was employed at Gary, Ind., with the U. S. Steel Corp., and before moving to Canton 15 years ago he was associated with a Newcastle, Pa., rolling mill and the Empire Steel Corp. at Mansfield.

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FRANK C. B. PAGE, who retired in 1935 as president of the E. W. Bliss Co., Brooklyn, N. Y., died at his home in that borough on Dec. 24, aged 68 years. He had been identified with the company since 1885, when he joined it as an office boy. He became executive vice-president in 1910 and president in 1927.

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FRANK N. HOFFSTOT, former president of the Pressed Steel Car Co., died at his home in New York after a long illness on Dec. 25, aged 77 years. He had been retired since 1934. For more than 30 years he held important executive positions with the company and had been president from 1908 to 1933, when the company went into receivership. He was appointed one of the receivers and helped in the work of reorganization.

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R. C. DANLY, president of the Danly Machine Specialties, Inc., Chicago, died at his home at Hinsdale, Ill., on Dec. 15, aged 66 years. He had been engaged in manufacturing activity for 46 years and during his long career had been associated with the Fanning Cycle Co., the Accurate Engineering Co., and International Harvester Co. He founded the Danly company in 1923. Three of his sons, Philo H., George I., and Robert E., are active in the management of the company.

N.A.M. Reveals Capital Flow Survey Results

WASHINGTON—Final results of a nationwide survey of representative investors to determine causes impeding the flow of new capital into business have been submitted to the Senate and the House of Representatives by the National Association of Manufacturers.

The investors questioned were chosen at random from stockholders' lists. Nearly 3000 investors responded to the question:

"Do you have money available which you could invest and would like to invest in new securities of either new or existing productive enterprises (as distinct from Government and other high grade bonds or the well seasoned stocks of existing companies) but which you do not care to invest in such securities at the present time?'

Response to this question showed 75.1 per cent answering "yes" and 24.9 per cent answering "no." Those answering "yes" were then asked to indicate the reason for their lack of willingness to make additional investments. Inadequate present profits was named by 38.4 per cent. Those who held doubts of adequate future profits gave many reasons for those doubts, the following being the most important: Labor trouble, 62.6 per cent; international troubles, 19.5 per cent; existing legislation, 76.4 per cent; possible new legislation, 73.6 per cent; existing taxes, 74.8 per cent; new taxes, 72.2 per cent. Many responses named several reasons.

Of those feeling that even if adequate profits were earned now or in the future the Government takes so much in taxes that investment is not worthwhile, 81,7 per cent said taxes are too great a burden on corporations and 60.7 per cent said they were too great a burden on individuals, many listing both. Government legislation was held to be too stringent in a number of ways, the most important being restrictions on purchase of securities 60.1 per cent; restrictions on sale of securities 56.9 per cent; and restrictions on new issuances 48 per cent. Many named all three.

Hammacher, Schlemmer & Co., 229 Fourth Avenue, New York, announces the discontinuance of its wholesale division handling mill supplies and heavy hardware in which business they have been engaged for 90 years. August Pahl, who has been connected with Hammacher, Schlemmer & Co. for many years, will organize his own company to take over this branch of the business.

E. J. HILL

F. E. MOONEY

J. N. QUINLAN

E. J. HILL, general superintendent in charge of technological coordination; F. E. Mooney, assistant to general superintendent, production; and J. N. Quinlan, assistant division superintendent, West mills, Gary Works, Carnegie-Illinois Steel Corp. Announcement of their appointments appeared in these columns two weeks ago.

PERSONALS

(CONTINUED FROM PAGE 41D)

training and traffic—reporting directly to Vice-President Clark.

RALPH A. TERRELL formerly with the Boyar-Schultz Corp., Chicago; chief engineer of the Ingersoll Steel & Disc Co., Chicago, and the South Bend Tool & Die Co., South Bend, Ind., has joined the sales organization of the Tool Equipment Sales Co., 24 South Pulaski Road, Chicago.

❖ ❖ ❖

S. D. YARDLEY, formerly assistant district sales manager in the Houston office of Republic Steel Corp., has been appointed assistant manager of sales in the sheet and strip headquarters division at Cleveland. Mr. Yardley was born in Philadelphia and was graduated from the University of Pennsylvania in 1915. During the World War he served as a lieutenant in the Navy and after leaving the service joined Gulf States Steel Co. as district sales manager in Virginia. He was in the Carolina district at the time of the Gulf States Steel merger with Republic. He has been in Houston since late in 1937.

H. F. KNAPP

A. J. SNOW

HARRY F. KNAPP, manager of sales, special accounts, with headquarters in Washington, Carnegie-Illinois Steel Corp., and Andrew J. Snow, new Washington district manager of sales. Details of their career appeared in these columns on Dec. 29.

British Company to Install Mesta Strip Mill

LONDON, Jan. 10 (By Cable). John Summers & Co. will increase its capital to £6,000,000 to finance the installation of a Mesta strip mill. The United States Companies and the Bankers Industrial Development Co., the latter representing the Bank of England, will subscribe for part. The control committee will consist of the governor and deputy governor of the Bank of England and John Summers, chairman of United Steel.

REINFORCING STEEL

ATLANTIC STATES
AWARDS

500 Tons, Holabird, Md., barracks, to Bethlehem Steel Co., Bethlehem, Pa., through Consolidated Engineering Co., contractor.

340 Tons, Chester, Pa., sewage disposal plant, to Bethlehem Steel Co., Bethlehem, Pa.

250 Tons, Portland, Me., Thomas Laughlin Co. manufacturing plant, to Bancroft & Martin Rolling Mills Co., South Portland, Me.

CENTRAL AND WESTERN STATES

1000 Tons, McChord Field, Wash., air corps barracks, to Northwest Steel Rolling Mills, Seattle.

850 Tons, Grand Coulee Dam, Wash., to Bethlehem Steel Co., San Francisco.

700 Tons, Los Angeles, San Diego navy warehouse, to Consolidated Steel Corp., Los Angeles.

700 Tons, Rantoul, Ill., Chanute Field barracks, to Joseph T. Ryerson & Son, Inc., Chicago, through Lipman Construction Co., contractor.

650 Tons, Texarkana, Ark., penitentiary, to Laclede Steel Co., St. Louis.

610 Tons, Decatur, Ill., outfall sewer to Laclede Steel Co., St. Louis, through File & Collins & Burt Bros. contractors.

400 Tons, Omaha, Neb., WPA sewer job, to Sheffield Steel Corp., Kansas City, through Ceco Steel Products Corp.

390 Tons, Los Angeles, Saks store addition, to Soule Steel Co., Los Angeles.

310 Tons, Anderson, Ind., sewage treatment plant, to Truscon Steel Co., Youngstown, through Love Construction Co., contractor.

280 Tons, Seattle, University of Washington building, to Northwest Steel Rolling Mills, Seattle.

270 Tons, Dillon, Mont., school, to Bethlehem Steel Co., Bethlehem, Pa., through Cahill & Mooney, contractors.

250 Tons, Marshfield, Wis., high school, to Truscon Steel Co., Youngstown, through W. C. Smith, contractor.

225 Tons, Marquette, Mich., Masonic Temple, to Bethlehem Steel Co., Bethlehem, Pa., through Western Construction Co., contractor.

200 Tons, Decatur, Ill., overflow sewer, to Laclede Steel Co., St. Louis.

200 Tons, Brainard, Minn., schools, to Truscon Steel Co., Youngstown; through George Lounsberry, contractor.

200 Tons, Cleveland, East approach to Main Street bridge, to Paterson-Leitch Co., Cleveland, through Lombardo Brothers Construction Co., Cleveland.

194 Tons, San Francisco, Bakersfield overcrossing, to Pacific States Steel Co.

184 Tons, Los Angeles, San Diego Fleet moorings, to Soule Steel Co., Los Angeles.

178 Tons, Redondo Beach, Cal., school, to Consolidated Steel Corp., Los Angeles.

175 Tons, Bloomington, Ind., business administration building, to Truscon Steel Co., Youngstown; through Sugarman Construction Co.

140 Tons, St. Louis, employees' dormitories at Koch Hospital, to Laclede Steel Co.; through Woerman Construction Co., general contractor, St. Louis.

140 Tons, East Lansing, Mich., girls' dormitory, Michigan State College, to Great Lakes Steel Corp., Ecorse, Mich.; Alfred Smith, contractor.

130 Tons, Decatur, Kan., highway bridge, to Sheffield Steel Corp.

130 Tons, Marinette, Wis., hospital, to Bethlehem Steel Co., Bethlehem, Pa., through Hutter Construction Co., contractor.

123 Tons, Sacramento, junior college, to Truscon Steel Co., San Francisco; through Azevedo Construction Co., Sacramento, contractor.

110 Tons, San Francisco, St. Emydius School, to Soule Steel Co., San Francisco; through Cahill Brothers, San Francisco, contractor.

100 Tons, Madison, Wis., Cancer Institute, to Truscon Steel Co., Youngstown; through Schumacher, contractor.

100 Tons, Portage, Wis., high school, to Bethlehem Steel Co., Bethlehem, Pa., through H. B. Kilstoffe, contractor.

100 Tons, Two Harbors, Minn., high school, to Bethlehem Steel Co., Bethlehem, Pa., through Lenci & Englund, contractors.

100 Tons Newberry, Mich., power plant, to Bethlehem Steel Co., Bethlehem, Pa., through C. W. Smith, contractor.

PENDING REINFORCING BAR PROJECTS

ATLANTIC STATES

1600 Tons, New York, sewage treatment plant.

550 Tons, Bethesda, Md., National Institute of Health.

350 Tons, Absecon, N. J., grade elimination; new bids Jan. 13.

300 Tons, Southbury, Conn., training school and home for feeble minded.

275 Tons, Gloucester, Mass., high school.

250 Tons, Springfield, Mass., trade school; George A. Fuller Co., Boston, contractor.

180 Tons, Wilmington, Del., hospital; bids in.

175 Tons, Staten Island, N. Y., marine hospital.

124 Tons, Montgomery County, N. Y., Canajoharie-Palatine bridge.

CENTRAL AND WESTERN STATES

800 Tons, Cincinnati, department store, F. & R. Lazarus Co.

714 Tons, Seattle, Lake Washington bridge; general contracts as follows: unit 1, 642 tons, Northwest Construction Co., Seattle; unit 2, 823 tons, Bates & Rogers Construction Corp., Chicago; units 3, 5, and 9, 1469 tons, Puget Construction Co., Seattle; unit 4, 8040 tons, Puget Sound Bridge & Dredging Co., Seattle, J. H. Pomeroy & Co., Inc., San Francisco, and Parker-Schram Co., Portland (joint award); unit 7, 740 tons, Dally Construction & Engineering Corp., Seattle (project previously reported).

713 Tons, Mare Island, Cal., quay wall revised tonnage (previously reported).

650 Tons, Los Angeles, May Co. store.

500 Tons, Columbus, Ohio, rail steel bars for Lazarus Co. warehouse; bids in.

500 Tons, Grand Rapids, Mich., reservoir; bids in.

461 Tons, Manitowoc, Wis., water storage project; A. L. Jackson Co., Chicago, low bidder.

400 Tons, Kalamazoo, Mich., State hospital.

370 Tons, Cincinnati, sewer.

268 Tons, Sheboygan, Wis., waterworks; Jacob Houmes, Sheboygan, low bidder.

247 Tons, Urbana, Ill., Gregory Hall; William E. O'Neil Construction Co., Chicago, low bidder.

221 Tons, Colorado Springs, Colo., undercrossing; bids Jan. 12.

220 Tons, Manteno, Ill., male and female wards, insane asylum; Permanent Construction Co., Chicago, low bidder.

175 Tons, Rantoul, Ill., hospital.

175 Tons, Los Angeles, University of California science building.

165 Tons, Rockford, Ill., school building, S. Jostrom & Sons, Inc., Rockford, low bidder.

163 Tons, Madison, Wis., Marquette School, H. B. Kilstoffe, Winona, Minn., low bidder.

144 Tons, Jacksonville, Ill., dormitory, E. C. Childers, Jefferson City, Mo., low bidder.

149 Tons, Gary, Ind., William Wirt School; bids in.

113 Tons, Upland, Cal., school.

110 Tons, Cleveland, Carter Road bridge substructure; bids Jan. 12.

110 Tons, Milwaukee, library, State Teachers College.

105 Tons, Dubuque, Iowa, Eagle Point reservoir.

105 Tons, Hammond, Ind., pumping station No. 2, H. B. Olney, Inc., East Chicago, Ind., low bidder.

103 Tons, Sparta, Wis., bridge; Milwaukee Bridge Co., contractor.

101 Tons, Bloomington, Ind., physical science building; John E. Ericeson Co., Chicago, low bidder.

100 Tons, Madison, Wis., Cancer Institute building; Morris Schumacher, low bidder.

100 Tons, Reedsburg, Wis., sewage treatment plant.

Unstated tonnage, Mansfield, Ohio, rail steel bars for John Simpson Junior High School; bids in.

CANAL ZONE

750 Tons; bids opened in Washington Jan. 10.

U. S. Steel Shipments Higher in December

SHIPMENTS of finished steel products by the U. S. Steel Corp. and subsidiary companies in December totaled 694,204 tons, a gain of 14,551 tons over the preceding month and 205,134 tons above the December, 1937, total.

For the year 1938 shipments aggregated 6,625,368 tons, the lowest yearly total since 1934. In 1937 shipments were 12,748,354 tons.

MONTHLY SHIPMENTS OF FINISHED STEEL PRODUCTS BY UNITED STATES STEEL CORP.—TONS

Month	1934 Shipments	1934 Per Cent of Capacity	1935 Shipments	1935 Per Cent of Capacity	1936 Shipments	1936 Per Cent of Capacity	1937 Shipments	1937 Per Cent of Capacity	1938 Shipments	1938 *Per Cent of Capacity
January	331,777	19.8	534,055	31.9	721,414	44.8	1,149,918	75.4	518,322	33.7
February	385,500	25.9	583,137	39.2	676,315	45.3	1,133,724	82.5	474,723	35.5
March	588,209	35.2	668,056	41.5	783,552	50.5	1,414,399	92.7	572,199	37.2
April	643,009	41.5	591,728	36.7	979,907	63.2	1,343,644	91.0	501,972	33.7
May	745,063	44.5	598,915	35.8	984,097	63.4	1,304,039	85.5	465,081	30.2
June	985,337	61.2	578,108	36.7	886,065	57.1	1,268,550	85.8	478,057	32.1
July	369,938	23.9	547,794	34.0	950,851	61.3	1,186,752	77.9	441,570	28.8
August	378,023	22.6	624,497	37.3	923,703	59.6	1,107,858	72.6	558,634	36.3
September	370,306	23.9	614,933	39.7	961,803	62.0	1,047,962	71.1	577,666	37.5
October	343,962	20.6	686,741	41.1	1,007,417	62.6	792,310	52.0	663,287	43.1
November	366,119	22.7	681,820	42.3	882,643	59.2	587,241	39.7	679,653	45.6
December	418,630	27.0	661,515	42.7	1,067,365	68.8	489,070	32.1	694,204	45.2
Minus yearly adjustment	(—19,907)	...	(—23,750)	...	(—40,859)	...	(—77,113)	...	.....	....
Total for year....	5,905,966	30.6	7,347,549	38.1	10,784,273	58.2	12,748,354	70.4	†6,625,368	†36.6

*Annual capacity 18,114,000 gross tons, with monthly percentages based on actual number of weeks in each month.
†Subject to yearly adjustment.

December Daily Pig Iron Output Drops 5.7 Per Cent

PRODUCTION of coke pig iron in December on a daily basis dropped 5.7 per cent from that in November, or from 75,666 gross tons a day to 71,314 tons. Output for the month totaled 2,210,728 tons, compared with 2,269,983 tons in November. For the 12 months, production amounted to 18,782,236 tons, contrasted with 36,611,317 tons for 1937.

There were 117 furnaces in blast on Jan. 1, operating at the rate of 71,315 tons a day, compared with 121 furnaces on Dec. 1, producing at the rate of 75,795 tons daily. Nine furnaces were blown out or banked during the month and five were put in operation. The United States Steel Corp. took two off blast, independent producers blew out or banked five and put four in operation, and merchant producers blew one in and took two units out of production.

Among the furnaces blown in were the following: One Bethlehem unit, Bethlehem Steel Co.; Anna, Struthers Iron & Steel Co.; one Otis, Otis Steel Co.; Hamilton No. 2, Hamilton Coke & Iron Co.; and the new Madeline furnace of the Inland Steel Co.

Furnaces blown out or banked included: One Carrie, Carnegie-Illinois Steel Corp.; one Lorain, National Tube Co.; Neville Island, Pittsburgh Coke & Iron Co.; one Sparrows Point, Bethlehem Steel Co.; two Hazelton, Republic Steel Corp.; one Shenango, Shenango Furnace Co.; one Riverside, Wheeling Steel Corp.; and one River, Republic Steel Corp.

The number of available furnaces making pig iron has been increased from 238 to 239 by the completion of the fifth Madeline furnace of the Inland Steel Co.

Production of Coke Pig Iron and Ferromanganese

Gross Tons

	Pig Iron*		Ferromanganese†	
	1938	1937	1938	1937
January	1,429,085	3,211,500	22,388	23,060
February	1,298,268	2,999,218	20,205	24,228
March	1,452,487	3,459,473	21,194	27,757
April	1,376,141	3,391,665	18,607	26,765
May	1,255,024	3,537,231	13,341	34,632
June	1,062,021	3,107,506	14,546	34,415
½ year	7,873,026	19,706,593	110,281	170,857
July	1,201,785	3,498,858	20,818	23,913
August	1,493,995	3,605,818	6,088	29,596
September	1,680,435	3,410,371	630	26,100
October	2,052,284	2,892,629	3,621	26,348
November	2,269,983	2,006,724	13,156	25,473
December	2,210,728	1,490,324	19,197	22,674
Year	18,782,236	36,611,317	173,791	324,961

*These totals do not include charcoal pig iron.
†Included in pig iron figures.

Merchant Iron Made, Daily Rate

Tons

	1938	1937	1936	1935	1934
January	10,635	16,106	10,537	3,926	7,800
February	8,854	16,514	11,296	6,288	7,071
March	8,524	16,457	10,831	7,089	7,197
April	8,273	14,517	13,897	8,799	8,838
May	6,431	19,483	12,814	8,441	9,099
June	5,375	15,870	14,209	7,874	9,499
July	5,495	19,609	11,619	8,644	7,880
August	6,614	17,831	12,148	8,194	6,043
September	11,205	20,065	12,526	10,090	4,986
October	10,799	18,950	13,645	11,199	5,765
November	13,208	15,662	14,739	12,503	6,610
December	9,130	10,964	14,852	13,312	4,399

Daily Average Production of Coke Pig Iron

Gross Tons

	1938	1937	1936	1935	1934
January	46,100	103,597	65,351	47,656	39,201
February	46,367	107,115	62,886	57,448	45,131
March	46,854	111,596	65,816	57,098	52,243
April	45,871	113,055	80,125	55,449	57,561
May	40,485	114,104	85,432	55,713	65,900
June	35,400	103,584	86,208	51,570	64,338
½ year	43,497	108,876	74,331	54,138	54,134
July	38,767	112,866	83,686	49,041	39,510
August	48,193	116,317	87,475	56,816	34,012
September	56,015	113,679	91,010	59,216	29,935
October	66,203	93,311	96,512	63,820	30,679
November	75,666	66,891	98,246	68,864	31,898
December	71,314	48,075	100,485	67,950	33,149
Year	51,458	100,305	83,658	67,556	43,592

Production by Districts and Coke Furnaces in Blast

FURNACES	Production (Gross Tons) December (31 Days)	Production (Gross Tons) November (30 Days)	January 1 Number in Blast	January 1 Operating Rate, Tons a Day	December 1 Number in Blast	December 1 Operating Rate, Tons a Day
New York:						
Buffalo	139,515	140,854	8	4,500	8	4,830
Other New York and Mass.	8,324	14,232	8	270	1	225
Pennsylvania:						
Lehigh Valley	59,476	53,274	4	1,950	3	1,220
Schuylkill Valley	16,228	15,824	1	525	1	530
Susquehanna and Lebanon Valleys	14,154	14,076	1	455	1	470
Pittsburgh District	354,907	386,293	15	11,200	18	13,080
Ferro. and Spiegel	9,084	5,740	2	295	1	190
Shenango Valley	32,893	34,277	1	715	2	1,145
Western Pennsylvania	50,923	39,947	3	1,645	3	1,330
Ferro. and Spiegel	6,860	4,584	1	220	1	155
Maryland	117,221	134,492	4	3,605	5	4,485
Wheeling District	117,307	125,109	5	3,515	6	4,170
Ohio:						
Mahoning Valley	220,968	263,105	11	7,700	12	9,020
Central and Northern	211,770	217,677	11	6,470	12	7,590
Southern	38,419	36,179	5	1,340	4	1,205
Illinois and Indiana	431,698	429,748	19	14,625	18	14,325
Michigan and Minnesota	89,762	86,964	5	2,895	5	2,900
Colorado, Missouri and Utah	25,488	20,775	2	820	2	695
Ferromanganese	.....	.....	0	...	0	...
The South:						
Virginia	.....	.....	0	...	0	...
Ferromanganese	3,253	2,832	1	105	1	95
Kentucky	11,200	9,701	1	360	1	325
Alabama	251,278	234,300	16	8,105	16	7,810
Tennessee	.....	.....	0	...	0	...
Total	2,210,728	2,269,983	117	71,315	121	75,795

Capital Goods Output Lowest Since 1934

ALTHOUGH the closing months of 1938 brought an encouraging improvement in the rate of operations in the capital goods industries, the pace for the year as a whole was the lowest since 1934, according to THE IRON AGE index of capital goods activity. The average for 1938 was 57.8 per cent of the 1925-27 average, which is used as a base in computing the index, as compared with 85.7 in 1937, 81.3 in 1936, 60.9 in 1935, and 52.0 in 1934.

The weighted monthly index for December was 80.8, a gain of 3.3 points over the November level and the sixth consecutive monthly increase from the year's low of 44.2 in June. In December, 1937, the monthly index stood at 59.2 after declining progressively from a high of 102.8 in August of the same year.

Current Metal Working Activity

Latest Data Assembled by THE IRON AGE from Recognized Sources

	December 1938	November 1938	December 1937	Twelve Months 1938	Twelve Months 1937
Steel Ingots: (gross tons)					
Monthly output[a]	3,143,169	3,572,220	1,473,021	27,839,261	49,502,907
Average weekly output[a]	711,124	832,685	333,263	533,933	949,423
Per cent of capacity[a]	53.00	62.05	25.37	39.79	52.14
Pig Iron: (gross tons)					
Monthly output[b]	2,201,627	2,269,983	1,490,324	18,773,135	36,611,317
Raw Materials:					
Coke output[c] (net tons)	.....	.....	2,996,525	.....	52,362,098
Lake Ore consumed[d] (gross tons)	.....	3,150,073	1,916,588	.....	53,996,076
Castings: (net tons)					
Malleable, orders[e]	.....	36,643	19,753	.....	549,972
Steel, orders[e]	.....	.....	27,024	.....	877,459
Finished Steel: (net tons)					
Trackwork shipments[a]	.....	2,276	3,804	.....	92,121
Fabricated shape orders[f]	.....	150,988	99,070	.....	1,628,641
Fabricated plate orders[e]	.....	20,213	27,463	.....	428,884
U. S. Steel Corp. shipments[g]	.....	679,653	489,070	.....	12,748,354
Fabricated Products:					
Automobile production[h]	411,319*	390,350	346,886	2,660,000*	5,016,437
Steel furniture shipments[e]	.....	$1,707‡	$2,125‡	.....	$26,973‡
Steel boiler orders[e] (sq. ft.)	.....	635,108	546,615	.....	9,923,457
Locomotives ordered[i]	.....	3	77	.....	368
Freight cars ordered[i]	.....	132	3,287	.....	52,788
Machine tool index[j]	.....	112.2	142.7	.....	140.8†
Foundry equipment index[k]	.....	89.7	111.2	.....	142.4†
Non-Ferrous Metals: (net tons)					
Lead shipments[l]	.....	42,030	34,020	.....	575,933
Lead stocks[l]	.....	115,236	129,131	.....	.....
Zinc shipments[m]	38,999	43,693	28,675	395,199	569,241
Zinc stocks[m]	126,604	120,778	65,333	.....	.....
Tin deliveries[n] (gross tons)	3,400	3,535	5,020	50,660	83,665
Refined copper deliveries[o]	.....	64,557	22,788	.....	865,893
Refined copper stocks[o]	.....	269,488	259,351	.....	.....
Exports: (gross tons)					
Total iron and steel[p]	.....	646,157	626,418	.....	7,567,884
All rolled and finished steel[p]	.....	120,610	450,555	.....	4,772,240
Scrap[p]	.....	448,020	319,016	.....	4,039,143
Imports: (gross tons)					
Total iron and steel[p]	.....	27,627	25,792	.....	533,160
Pig iron[p]	.....	1,493	9,128	.....	111,697
All rolled steel[p]	.....	12,554	14,475	.....	284,571
British Production: (gross tons)					
Pig iron[q]	.....	461,500	783,800	.....	8,495,200
Steel Ingots[q]	.....	860,000	1,103,800	.....	12,964,000

† Three months' average. ‡ 000 omitted. * Preliminary.

Source of data: [a] American Iron and Steel Institute; [b] THE IRON AGE; [c] Bureau of Mines; [d] Lake Superior Iron Ore Association; [e] Bureau of the Census; [f] American Institute of Steel Construction; [g] United States Steel Corp.; [h] Preliminary figures from Ward's Automotive Reports—Final figures from Bureau of the Census, U. S. and Canada; [i] *Railway Age*; [j] National Machine Tool Builders Association; [k] Foundry Equipment Manufacturers Association; [l] American Bureau of Metal Statistics; [m] American Zinc Institute; [n] New York Commodity Exchange; [o] Copper Institute; [p] Department of Commerce; [q] British Iron and Steel Federation.

FABRICATED STEEL

. . . Lettings decline to 19,600 tons from 36,100 tons last week . . . New projects higher at 15,320 tons . . . Plate awards call for 6900 tons.

NORTH ATLANTIC STATES

AWARDS

1700 Tons, Red Bank, N. J., Oceanic bridges, to Bethlehem Steel Co., Bethlehem, Pa.

1500 Tons, Baltimore, extension to boiler plant, Consolidated Gas, Electric Light & Power Co., to Belmont Iron Works, Philadelphia.

725 Tons, Long Beach, L. I., high school, to American Bridge Co., Pittsburgh; through Chapman-Kruge Engineering Co.

600 Tons, Pittsburgh, South Vocational School, to Bethlehem Steel Co., Bethlehem, Pa.

555 Tons, Norwich, Conn., infirmary building, Uncas-on-Thames, to Lehigh Structural Steel Co., Allentown, Pa.

330 Tons, Frederick, Md., high school, to Rosslyn Steel & Cement Co., Rosslyn, Va.

315 Tons, Baltimore, Catholic high school, to Baltimore Steel Co., Baltimore; through Cummins Construction Corp., general contractor.

314 Tons, Brooklyn, Fort Green health center, to Lehigh Structural Steel Co., Allentown, Pa.

280 Tons, South Kortright, N. Y., Central School, to American Bridge Co., Pittsburgh.

250 Tons, Lawrence, Mass., two bridges, North and South Broadway, to Bethlehem Steel Co., Bethlehem, Pa.; General Construction Co., Lawrence, contractor.

225 Tons, Binghamton, N. Y., city hospital, to Bethlehem Contracting Co., Bethlehem, Pa.

225 Tons, Jamestown, N. Y., factory building for Hope Windows, Inc., to Central Steel Construction Co., Buffalo.

200 Tons, Norwich, Conn., Eighth Street bridge, to Harris Structural Steel Co., Plainfield, N. J.; through F. T. Wescott, general contractor.

195 Tons, Brocton, N. Y., Central School, to Ernst Iron Works, Buffalo.

190 Tons, Coxsackie, N. Y., cell block No. 35, to American Bridge Co., Pittsburgh.

180 Tons, Elmira, N. Y., Riverside School No. 7, to American Bridge Co., Pittsburgh.

180 Tons, Washington, inspection stations, to Fort Pitt Bridge Works Co., Pittsburgh.

160 Tons, Argyle, N. Y., Central School, to American Bridge Co., Pittsburgh.

145 Tons, Bedford Hills, N. Y., segregation building, to Weatherly Steel Co., Weatherly, N. Y.

140 Tons, Long Island City, N. Y., warehouse, Fanbar Holding Corp., to American Bridge Co., Pittsburgh.

130 Tons, Waverly, N. Y., senior high school, to American Bridge Co., Pittsburgh.

120 Tons, Nassau, N. Y., Central School, to James McKinney & Son, Albany, N. Y.; Lauge-Finn Construction Co., general contractor.

115 Tons, Cambridge, Md., bridge, to American Bridge Co., Pittsburgh.

100 Tons, Huntington, Vt., State Bridge, to American Bridge Co., Pittsburgh; M. De Groot, Jericho, Vt., contractor.

SOUTH AND SOUTHWEST

1510 Tons, Cliffside, N. C., power house, Duke Power Co., to Virginia Bridge Co., Roanoke, Va.

1300 Tons, Selma, Ala., bridge, to Nashville Bridge Co., Nashville, Tenn.

740 Tons, Charleston, S. C., armory, to Virginia Bridge Co., Roanoke, Va.

500 Tons, Williamsburg, Va., Chickahoming River bridge, to Bethlehem Steel Co.

445 Tons, Vinita, Okla., arch forms for Pensacola Dam, to Blaw-Knox Co., Pittsburgh.

410 Tons, Raleigh, N. C., Department of Justice building, to Ingalls Iron Works Co., Birmingham; through J. J. McDevitt, general contractor.

255 Tons, McLairn, Miss., cantilever girders, to Virginia Bridge Co., Roanoke, Va.

230 Tons, Gilbertsville, Ky., Lock Harbor bridge, TVA, to American Bridge Co., Pittsburgh.

170 Tons, Louisville, Ky., library, to Virginia Bridge Co., Roanoke, Va.

130 Tons, Merrill, Miss., cantilever girders, to Virginia Bridge Co., Roanoke, Va.

110 Tons, Louisville, Ky., roundhouse alterations, Louisville & Nashville Railroad, to American Bridge Co., Pittsburgh.

CENTRAL STATES

800 Tons, Chicago, North State Street subway, contract S5, to Joseph T. Ryerson & Son, Chicago.

459 Tons, Madison, Wis., 252 tons for Washington school, 207 tons for Burroughs school, to Joseph T. Ryerson & Son, Inc., Chicago; through J. H. Findorf & Son, Madison.

400 Tons, Sandusky, Ohio, factory building for Hinde & Dauch Paper Co., to Taylor & Gaskin Co.

300 Tons, Shelly, Minn., Red River bridge for states of North Dakota and Minnesota, to Illinois Steel Bridge Co., Jacksonville, Ill.

265 Tons, Harrison, Ill., State bridge, to St. Louis Structural Steel Co.

255 Tons, Keokuk County, Iowa, beam and truss spans, to Des Moines Steel Co., Des Moines, Iowa, and Pittsburgh-Des Moines Steel Co., Pittsburgh.

200 Tons, Houghton, Mich., men's dormitory, Michigan College of Mining Technology, to Worden-Allen Co., Milwaukee.

190 Tons, Mitchell, Ill., bridge section, to St. Louis Structural Steel Co., St. Louis.

190 Tons, Plainfield, Ind., boys' dormitory, to W. J. Holiday & Co., Chicago; through Henke Construction Co., Chicago.

165 Tons, Ottumwa, Iowa, plate girder span, to American Bridge Co., Pittsburgh, and Ottumwa Bridge & Construction Co., Ottumwa, Iowa.

157 Tons, Terre Haute, Ind., fine arts building, to Joseph T. Ryerson & Son, Inc., Chicago; through James McHugh Sons, Inc., Chicago.

135 Tons, Cincinnati, Kellogg Avenue bridge repairs, to Carnegie-Illinois Steel Corp.

133 Tons, Marinette, Wis., hospital, to Bethlehem Steel Co., Bethlehem, Pa.; through Hutter Construction Co., Fond du Lac, Wis.

130 Tons, Chicago, Scott School addition, to Atlas Iron Works, St. Louis.

130 Tons, Great Lakes, Ill., transportation and fire station building, to Gage Structural Steel Co., Chicago.

125 Tons, Cleveland, approach to Main Street bridge, to Mount Vernon Bridge Co., Mount Vernon, Ohio; through Lombardo Brothers Construction Co., Cleveland.

105 Tons, Chicago, Oakenwald School addition, to New City Iron Works, Chicago.

105 Tons, Van Wert County, Ohio, bridge, to Burger Iron Co., Akron, Ohio.

103 Tons, Waukesha, Wis., bridge, to Joseph T. Ryerson & Son, Inc.; through Bentley Construction Co., Milwaukee.

100 Tons, Youngstown, Ohio, bridges Nos. 1 and 2, to Sauce Engineering Co.

WESTERN STATES

244 Tons, Zane, Idaho, three bridges, Department of Agriculture, to Stupp Brothers Bridge & Iron Co., St. Louis.

115 Tons, Clackamas County, Ore., bridge, to Poole & McGonigle, Portland, Ore.

PENDING STRUCTURAL PROJECTS

NORTH ATLANTIC STATES

950 Tons, Montgomery County, N. Y., State highway bridge.

900 Tons, New London, Conn., barracks; Turner Construction Co., Boston, contractor.

775 Tons, Absecon, N. J., grade elimination; to be re-bid Jan. 18.

700 Tons, Southbury, Conn., State training school and hospital for feeble minded.

700 Tons, Cambridge, Mass., addition to building, Lever Brothers.

600 Tons, Gloucester, Mass., high school.

400 Tons, New York, Bowery Bay sewage plant.

365 Tons, Cummington, Mass., State bridge over Westfield River.

180 Tons, New York, Cross Island Parkway grade separation.

THE SOUTH

2500 Tons, Richmond, Va., hospital building, Medical College of Virginia.

800 Tons, Columbia, S. C., State office building.

200 Tons, Pine Bluff, Ark., extension to Frisco Railroad machine shops.

CENTRAL STATES

1750 Tons, Indianapolis, stock pavilion, Indiana State Fair.

1500 Tons, Lafayette, Ind., Purdue University music hall; bids Jan. 18.

700 Tons, State of Indiana, 10 bridges; bids in.

350 Tons, Youngstown, police station.

300 Tons, Morristown, Ind., state bridge, cont. No. 1759.

265 Tons, Sandusky, Ohio, trestle for car dumper, Pennsylvania Railroad Co.

150 Tons, Bloomington, Ind., physical science building, Indiana University.

150 Tons, Wyanet, Ill., repairs to railroad bridges.

135 Tons, Brownstown, Ind., state bridge, cont. No. 1756.

125 Tons, Mason City, Iowa, public library; bids Jan. 17.

WESTERN STATES

5207 Tons, Seattle, Lake Washington bridge; general contracts as follows: Units 3, 5 and 9, 3840 tons, Puget Construction Co., Seattle; Unit 4, 1367 tons, Puget Sound Bridge & Dredging Co., Seattle, J. H. Pomeroy & Co., Inc., San Francisco, and Parker-Schram Co., Portland, joint award. (Project previously reported.)

460 Tons, Seattle, Pier 40; bids in.

214 Tons, Los Angeles, Chapman Station undercrossing; bids Jan. 26.

150 Tons, Los Angeles, Prado Dam service gates and accessories; Phillips & Davies, Inc., Kenton, Ohio, low bidder.

FABRICATED PLATES

AWARDS

2523 Tons, Los Angeles, aqueduct laterals for Metropolitan Water District, to Western Pipe & Steel Co., Los Angeles.

2000 Tons, Torrance, Cal., pipe line to Long Beach, to Western Pipe & Steel Corp., Los Angeles.

1000 Tons, Colorado Springs, Colo., pipe line, to Taylor Forge & Pipe Co., Chicago.

725 Tons, Cape May County, N. J., bridge caissons, to Bethlehem Steel Co., Bethlehem, Pa.

500 Tons, Tacoma, Wash., pipe line, to Steel Tank & Pipe Co., Portland, Ore.

355 Tons, Kalamazoo, Mich., two elevated tanks, to Chicago Bridge & Iron Co., Chicago.

275 Tons, Lapine, Ore., gates and conduit units for Wickiup Dam (Specification 812), to Koppers Co., Baltimore.

135 Tons, Jersey City, N. J., 48-in. sewer pipe, to Alco Steel Products Co., Dunkirk, N. Y.

105 Tons, Buffalo, tar tank, Donner-Hanna Coke Corp., to Buffalo Tank Corp., Buffalo.

SHEET PILING

AWARDS

114 Tons, Blaisdell, Ariz., Gila project (Invitation 24665-A), to Carnegie-Illinois Steel Corp., Pittsburgh.

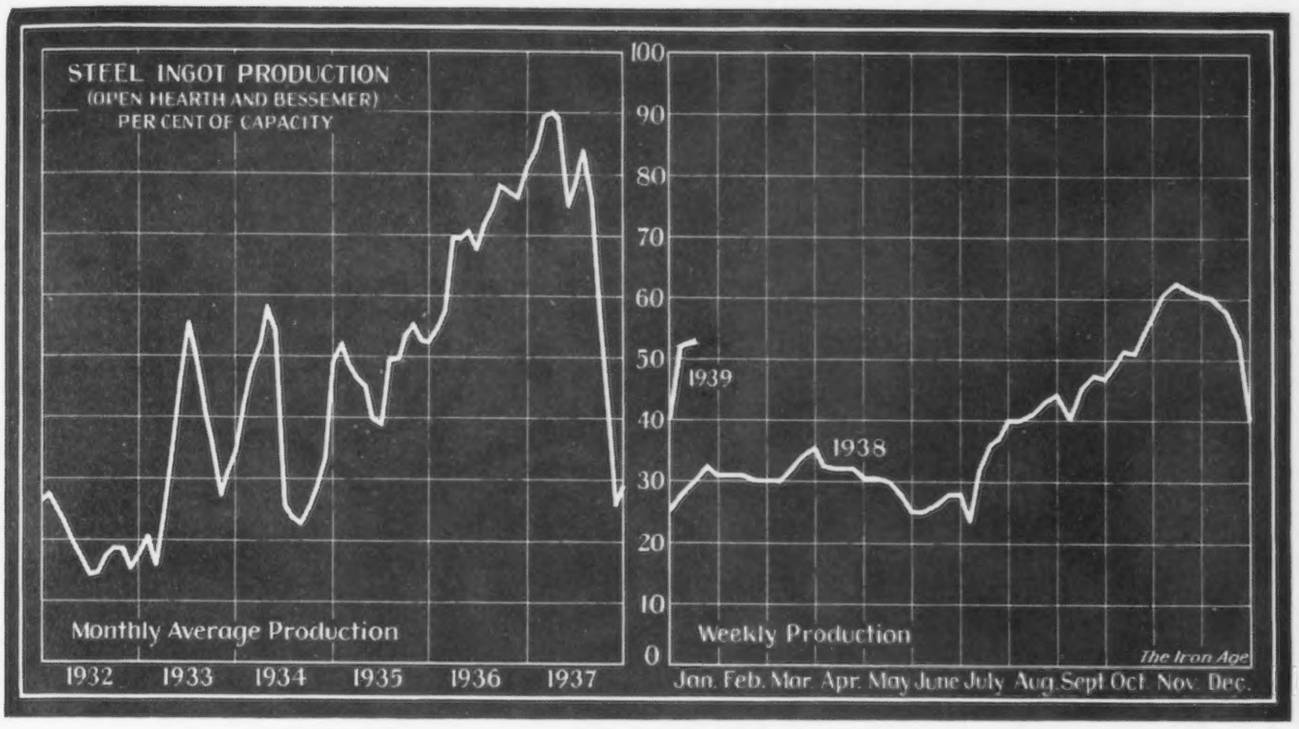
100 Tons, Akron, Ohio, Mud Run pumping station, to Bethlehem Steel Co., Bethlehem, Pa.

PENDING PROJECTS

900 Tons, Detroit, 72-in. pipe line; bids in.

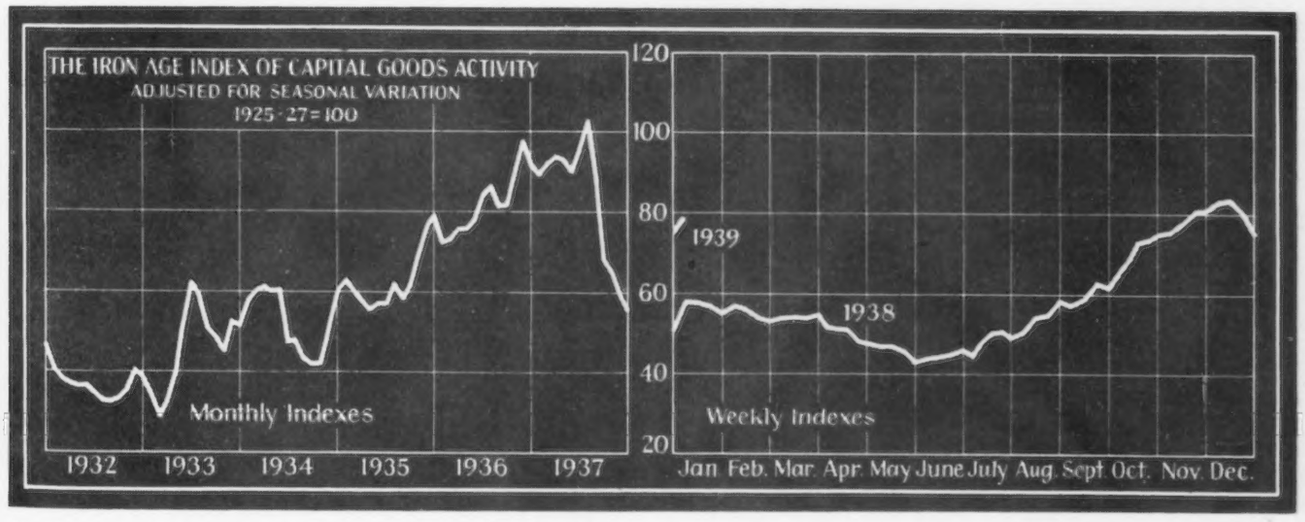
500 Tons, Cleveland, Carter Road bridge; bids Jan. 12.

Ingot Production Rises ½ Point to 52½ Per Cent



District Ingot Production, Per Cent of Capacity	Pitts-burgh	Chicago	Valleys	Phila-delphia	Cleve-land	Wheel-ing	Buffalo	Detroit	Southern	S. Ohio River	Western	St. Louis	East-ern	Aggre-gate
CURRENT WEEK..	44.0	49.0	52.0	35.0	46.0	80.0	45.0	84.0	60.5	63.5	40.0	47.5	75.0	**52.5**
PREVIOUS WEEK..	45.0	52.5	47.0	32.0	45.0	77.0	39.5	84.0	60.5	63.5	40.0	59.0	75.0	**52.0**

Steel and Construction Gains Boost Index 3.3 Points



LED by a sharp rebound in steel production from the holiday dip and the heaviest weekly volume of engineering awards since the week of June 24, 1937, THE IRON AGE index of capital goods activity rose 3.3 points to 78.9 in the week ended Jan. 7. The week's high level of building awards is directly attributable to public work, the total for this classification was 59 per cent above the preceding week and 146 per cent above the like week of 1938. Private awards were 7 and 40 per cent lower respectively than the preceding week and a year ago. The other factors of the index are still under the depressing influence of the holidays.

	Week Ended Jan. 7	Week Ended Dec. 31	Comparable Week 1938	Comparable Week 1929
Steel ingot production[1]	98.0	65.1	40.8	121.9
Automobile production[2]	85.2	93.8	58.0	111.5
Construction contracts[3]	94.6	90.3	64.0	111.5
Forest products carloadings[4]	50.2	61.9	42.5	127.8
Production and shipments, Pittsburgh District[5]	66.3	67.1	50.3	121.0
Combined index	**78.9**	**75.6**	**51.1**	**118.7**

Sources: 1. THE IRON AGE; 2. Ward's Automotive Reports; 3. *Engineering News-Record*; 4. Association of American Railroads; 5. University of Pittsburgh.

. . . SUMMARY OF THE WEEK . . .

. . . Orders have improved slightly; no strong upward trend.

o o o

. . . Operations up half a point; some districts gain, others lose.

o o o

. . . 15,000-ton pipe line order and 9000 tons of rails placed.

NO strong upward trend in steel business has developed in the new year, but following the year-end lull orders have improved to approximately the volume of early December. Buyers are pursuing a cautious policy of hand-to-mouth buying.

Such improvement as may come in the next few weeks will be mainly in new orders from the automobile industry, specifications for structural steel and reinforcing bars against recent awards, possibly some additional railroad buying and an increasing volume of orders for tin plate.

The automobile industry is placing small orders, with larger volume expected in late January or early February. The car sales volume for midwinter is encouraging. Manufacturers of bearings, whose activity foreshadows that of automobile assemblies by about six weeks, are working at a high rate.

A good share of incoming tonnage at the mills consists of specifications for structural steel and reinforcing bars. With the passing of the Dec. 31 deadline on the placing of PWA projects, new work in building construction is in at least a temporary lull, but the mills will get the benefit of recent awards for some time to come.

The week's lettings of fabricated structural steel were 19,600 tons, while new work amounting to more than 15,000 tons came into the market. There were also awards of jobs requiring a total of 6900 tons of plates. Awards of reinforcing bars were upward of 10,000 tons and new work totaled 11,000 tons.

Can manufacturers, whose forthcoming orders for tin plate will be of material aid in raising the level of steel production, are marking time pending the canners convention to be held in Chicago late this month. While it is certain that tin plate production this year will exceed the relatively poor total of 1938, there is some hesitancy among can makers because of the large carryover stocks of canned goods which must be liquidated if a normal volume of canning is to take place next summer. Meanwhile tin plate production has risen to about 41 per cent, 10 points or more above the December average.

Railroad buying is a long way from being brisk, but it is becoming much more of a factor than it was during most of last year. The New Haven has ordered 9000 tons of rails, divided equally between two leading makers, and the Southern Pacific is inquiring for an unstated tonnage. The Pennsylvania has ordered 15 dining cars, 5 to be built of aluminum, 5 of light weight, high tensile steel, and 5 of stainless steel.

Activity in pipe lines, long dormant except for small tonnages, is marked this week by the placing of 15,000 tons of seamless pipe for a subsidiary of the Ohio Oil Co., three mills sharing the business.

STEEL ingot production for this week is estimated at 52½ per cent, up half a point over last week. There have been declines at Pittsburgh and Chicago, with gains in the Wheeling-Weirton, Cleveland-Lorain, Youngstown and Buffalo districts.

The 1938 total of open-hearth and Bessemer ingot production, according to official figures of the American Iron and Steel Institute, was 27,839,261 gross tons, the December total having been 3,143,169 tons. The yearly average was 39.79 per cent of capacity, the fourth quarter average 55.77 per cent, the best month November at 62.05 per cent and the poorest month June at 28.46 per cent. Fourth quarter production was at an annual rate of 39,333,292 tons.

PRICES of steel products, excepting a few items on which jobbers' selling policies exert a greater influence than those of the mills, are fairly firm. The exceptions are reinforcing bars, galvanized flat sheets and roofing, wire nails and merchant pipe, but in some of these the situation is somewhat better than it has been.

Scrap markets are still waiting to take their cue from the trend of steel production. The undertone is firm, but there has not been enough mill buying to bring any rise in prices. THE IRON AGE scrap composite price remains at $14.92 for the fifth week.

A Comparison of Prices

Market Prices at Date, and One Week, One Month, and One Year Previous
Advances Over Past Week in Heavy Type, Declines in Italics

Rails and Semi-finished Steel

Per Gross Ton:	Jan. 10, 1939	Jan. 3, 1939	Dec. 13, 1938	Jan. 11, *1938
Rails, heavy, at mill	$40.00	$40.00	$40.00	$42.50
Light rails: Pittsburgh, Chicago, Birmingham	40.00	40.00	40.00	43.00
Rerolling billets: Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham, Sparrows Point.	34.00	34.00	34.00	37.00
Sheet bars: Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point	34.00	34.00	34.00	37.00
Slabs: Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham, Sparrows Point	34.00	34.00	34.00	37.00
Forging billets: Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham	40.00	40.00	40.00	43.00
Wire rods: Nos. 4 and 5, Pittsburgh, Chicago, Cleveland	43.00	43.00	43.00	47.00
Skelp, grvd. steel: Pittsburgh, Chicago, Youngstown, Coatesville, Sparrows Point, cents per lb.	1.90	1.90	1.90	2.10

Finished Steel

Cents Per Lb.:				
Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham	2.25	2.25	2.25	2.45
Plates: Pittsburgh, Chicago, Gary, Birmingham, Sparrows Point, Cleveland, Youngstown, Coatesville, Claymont	2.10	2.10	2.10	2.25
Structural shapes: Pittsburgh, Chicago, Gary, Buffalo, Bethlehem, Birmingham	2.10	2.10	2.10	2.25
Cold finished bars: Pittsburgh, Buffalo, Cleveland, Chicago, Gary	2.70	2.70	2.70	2.90
Alloy bars: Pittsburgh, Chicago, Buffalo, Bethlehem, Massillon or Canton	2.80	2.80	2.80	3.00
Hot rolled strip: Pittsburgh, Chicago, Gary, Cleveland, Middletown, Youngstown, Birmingham	2.15	2.15	2.15	2.40
Cold rolled strip: Pittsburgh, Cleveland, Youngstown	2.95	2.95	2.95	3.20
Sheets, galv., No. 24: Pittsburgh, Gary, Sparrows Point, Buffalo, Middletown, Youngstown, Birmingham	3.50	3.50	3.50	3.80
Hot rolled sheets: Pittsburgh, Gary, Birmingham, Buffalo, Sparrows Point, Cleveland, Youngstown, Middletown	2.15	2.15	2.15	...
Cold rolled sheets: Pittsburgh, Gary, Buffalo, Youngstown, Cleveland, Middletown	3.20	3.20	3.20	...
Wire nails: Pittsburgh, Chicago, Cleveland, Birmingham	2.45	2.45	2.45	2.75
Plain wire: Pittsburgh, Chicago, Cleveland, Birmingham	2.60	2.60	2.60	2.90
Barbed wire, galv.: Pittsburgh, Chicago, Cleveland, Birmingham	3.20	3.20	3.20	3.40
Tin plate, 100 lb. base box: Pittsburgh and Gary	$5.00	$5.00	$5.00	†$5.35

*Pittsburgh prices only.
†Subject to post-season adjustment.

Pig Iron

Per Gross Ton:				
No. 2 fdy., Philadelphia	$22.84	$22.84	$22.84	$25.84
No. 2, Valley furnace	21.00	21.00	21.00	24.00
No. 2, Southern Cin'ti	21.06	21.06	21.06	23.89
No. 2, Birmingham	17.38	17.38	17.38	20.38
No. 2, foundry, Chicago†	21.00	21.00	21.00	24.00
Basic, del'd eastern Pa.	22.34	22.34	22.34	25.34
Basic, Valley furnace	20.50	20.50	20.50	23.50
Malleable, Chicago†	21.00	21.00	21.00	24.00
Malleable, Valley	21.00	21.00	21.00	24.00
L. S. charcoal, Chicago	28.34	28.34	28.34	30.24
Ferromanganese, seab'd carlots	92.50	92.50	92.50	102.50

†The switching charge for delivery to foundries in the Chicago district is 60c. per ton.

Scrap

Per Gross Ton:				
Heavy melting steel, P'gh	$15.75	$15.75	$15.75	$14.25
Heavy melting steel, Phila.	15.25	15.25	15.25	14.75
Heavy melting steel, Ch'go	13.75	13.75	13.75	13.00
Carwheels, Chicago	12.50	12.50	12.50	15.50
Carwheels, Philadelphia	16.75	16.75	16.75	16.25
No. 1 cast, Pittsburgh	15.50	15.50	15.50	16.25
No. 1 cast, Philadelphia	16.75	16.75	16.75	16.75
No. 1 cast, Ch'go (net ton)	12.50	12.50	12.50	12.50

Coke, Connellsville

Per Net Ton at Oven:				
Furnace coke, prompt	$3.75	$3.75	$3.75	$4.00
Foundry coke, prompt	4.75	4.75	4.75	5.00

Non-Ferrous Metals

Cents per Lb. to Large Buyers:				
Copper, electrolytic, Conn.	11.25	11.25	11.25	10.875
Copper, lake, New York	11.375	11.375	11.375	11.125
Tin (Straits), New York	46.75	46.50	46.00	42.75
Zinc, East St. Louis	4.50	4.50	4.50	5.00
Zinc, New York	4.89	4.89	4.89	5.35
Lead, St. Louis	4.70	4.70	4.60	4.75
Lead, New York	4.85	4.85	4.75	4.90
Antimony (Asiatic), N. Y.	14.00	14.00	14.00	15.625

On export business there are frequent variations from the above prices. Also in domestic business, there is at times a range of prices on various products, as shown in our detailed price tables.

The Iron Age Composite Prices

	Finished Steel	Pig Iron	Steel Scrap
January 10, 1939	2.286 a Lb.	$20.61 a Gross Ton	$14.92 a Gross Ton
One week ago	2.286	20.61	14.92
One month ago	2.286	20.61	14.92
One year ago	2.512c.	23.25	14.00

Based on steel bars, beams, tank plates, wire, rails, black pipe, sheets and hot-rolled strip. These products represent 85 per cent of the United States output.

Based on average basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Southern iron at Cincinnati.

Based on No. 1 heavy melting steel quotations at Pittsburgh, Philadelphia and Chicago.

	Finished Steel — High	Finished Steel — Low	Pig Iron — High	Pig Iron — Low	Steel Scrap — High	Steel Scrap — Low
1938	2.512c., May 17	2.211c., Oct. 18	$23.25, June 21	$19.61, July 6	$15.00, Nov. 22	$11.00, June 7
1937	2.512c., Mar. 9	2.249c., Jan. 4	23.25, Mar. 9	20.25, Feb. 16	21.92, Mar. 30	12.92, Nov. 16
1936	2.249c., Dec. 28	2.016c., Mar. 10	19.73, Nov. 24	18.73, Aug. 11	17.75, Dec. 21	12.67, June 9
1935	2.062c., Oct. 1	2.056c., Jan. 8	18.84, Nov. 5	17.83, May 14	13.42, Dec. 10	10.33, Apr. 23
1934	2.118c., Apr. 24	1.945c., Jan. 2	17.90, May 1	16.90, Jan. 27	13.00, Mar. 13	9.50, Sept. 25
1933	1.953c., Oct. 3	1.792c., May 2	16.90, Dec. 5	13.56, Jan. 3	12.25, Aug. 8	6.75, Jan. 3
1932	1.915c., Sept. 6	1.870c., Mar. 15	14.81, Jan. 5	13.56, Dec. 6	8.50, Jan. 12	6.43, July 5
1931	1.981c., Jan. 13	1.883c., Dec. 29	15.90, Jan. 6	14.79, Dec. 15	11.33, Jan. 6	8.50, Dec. 29
1930	2.192c., Jan. 7	1.962c., Dec. 9	18.21, Jan. 7	15.90, Dec. 16	15.00, Feb. 18	11.25, Dec. 9
1929	2.223c., Apr. 2	2.192c., Oct. 29	18.71, May 14	18.21, Dec. 17	17.58, Jan. 29	14.08, Dec. 3
1928	2.192c., Dec. 11	2.142c., July 10	18.59, Nov. 27	17.04, July 24	16.50, Dec. 31	13.08, July 2
1927	2.402c., Jan. 4	2.212c., Nov. 1	19.71, Jan. 4	17.54, Nov. 1	15.25, Jan. 17	13.08, Nov. 22

. . THIS WEEK'S MARKET NEWS . .

STEEL OPERATIONS

. . . Rate for country a half point higher at 52½%

THE ingot producing rate for the industry as a whole is estimated by THE IRON AGE at mid-week at 52½ per cent, a gain of a half point over last week. The estimate of the American Iron and Steel Institute, issued on Monday, was 51.7, a gain of a point over the previous week.

There were declines in the two largest districts. PITTSBURGH is down fractionally at 44 per cent and CHICAGO dropped three and a half points to 49 per cent.

On the other hand, there were gains in other districts. WHEELING-WEIRTON is up four point to 80 per cent, YOUNGSTOWN has gained five points to 52 per cent, and CLEVELAND-LORAIN is up one point to 46 per cent, while BUFFALO is more than five points higher at 45 per cent.

PIG IRON

. . . Shipments show steady improvement in most districts

THE volume of business at PITTSBURGH is slightly heavier than in December, and further acceleration is looked for when certain larger consumers digest current inventories. At CHICAGO, January shipments will be at least 10 per cent above December, the latter month having been the best in 1938 for coke shipments and second only to November for pig iron deliveries. Agricultural machinery foundries in the West report improved melt and jobbing shops likewise are more active, although in general CHICAGO inventories are large enough to preclude additional merchant stack activity for several months yet.

Following the taking of inventory, foundries in the CLEVELAND and YOUNGSTOWN districts are rebuilding stocks, sufficiently so that furnace shipments are better than 10 per cent above December deliveries. Steel foundries in that area have secured additional railroad work and increasing iron demand from that direction is encouraging the market. At PHILADELPHIA deliveries are slowly improving, and at present there is little competition from foreign furnaces, while at BUFFALO melters regard 1939 with considerable optimism, although so far there has been no buying movement. An additional merchant stack has been blown in by a Buffalo producer, although shipments so far in the new year have been disappointing. The SOUTHERN OHIO market shows little change, although an expansion later in the month is freely predicted, at ST. LOUIS specifications are coming in in such good volume that the January movement will easily exceed December, the latter month having been the best in 1938. At BIRMINGHAM, 16 furnaces are in blast, and shipments which began to slide off around the middle of December, are now improving slowly. NEW YORK deliveries show a slight recovery from the holiday lull, the largest current inquiry being for 500 tons, with the average being between 100 and 150 tons. Several small export inquiries are out, but domestic producers have little hope of underbidding Continental producers.

NEW BUSINESS

. . . Moderate improvement over year-end dullness develops

NEW business at PITTSBURGH is in slightly better volume than a week ago. The improved demand noted several months ago has not resumed its upward trend, but indications are that incoming business will show a moderate spurt by early February. The pipe market gained support last week when an order for 15,000 tons of pipe was placed by Illinois Pipe Line Co. with three leading seamless tube makers. Some steel producers are slightly disappointed that the current volume of business is not up to previous expectations; however, the general consensus is that no strong influx of fresh orders should be expected this month.

In the CLEVELAND and YOUNGSTOWN districts new business and shipments have returned close to the pre-holiday levels, and pig iron deliveries for the first six business days are running approximately 10 per cent ahead of those in the comparable December period. Optimism is widespread, but several weeks at least will be required before marked improvement comes. In the meantime it appears the specifications forthcoming will be more for immediate use than for inventory expansion.

Sales at CHICAGO are proceeding at a good rate despite the general inventory period. One sales office is running 25 per cent ahead of last week, the gain being caused principally by increased implement and farm tractor specifications. Demand for tillage tools is light but will increase in the spring. One large maker of farm equipment who sold 20,000 combines last year is aiming at 24,000 in 1939. Automobile steel needs continue prominent. In the past week, sheets, bars, forgings and miscellaneous castings have been in demand.

A washing machine company expects more business in the first half of this year than in all of 1938.

In NEW YORK some mills are getting approximately the volume of business of early December, but in PHILADELPHIA there has been scarcely any improvement over the low volume of late December. Year-end dullness still prevails in ST. LOUIS, while at BIRMINGHAM orders are improving.

PRICES

. . . Quotations by mills appear to be stronger

EXCEPT for those items in which jobbers exert a more important influence on price policies than the mills, the price situation seems to be strengthening. The unsatisfactory financial results of 1938 perhaps have had a sobering effect on many steel companies.

Jobbers' items, such as reinforcing bars, galvanized flat sheets and roofing and wire nails. Prices on reinforcing bars are "all over the lot," being so irregular that mills and distributors can scarcely keep track of them.

SEMI-FINISHED STEEL

. . . Stocks low at non-integrated mills . . . Buying small

BOOKINGS at PITTSBURGH increased in a small way during the past week and further improved demand is expected. Consumers' stocks are not large, especially at non-integrated sheet and tin plate plants. A few weeks will be required, however, before a clear indication of future trends is indicated.

CLEVELAND and YOUNGSTOWN pro-

ducers report stocks are low at non-integrated mills. Whether these inventories will be built up right away remains a question.

TIN PLATE

. . . Operations higher . . . Better buying expected soon

A GENERAL increase in specifications is looked for after the canners' convention late this month. Meanwhile, orders are miscellaneous with a slight improvement in overall buying. Operations are estimated at 41 per cent. Export buying is a moderate factor but tonnages are not large.

PLATES

. . . Market still dull . . . Railroad requirements slightly larger

ALTHOUGH railroad requirements are slightly larger, the plate market is still dull. High pressure work for oil refineries is bringing in some business.

Steel pipe requiring more than 2500 tons of plates will be used for 7.2 miles of aqueduct laterals by the Metropolitan Water District of Los Angeles. Although very slightly underbid by concrete on a portion of the job, the contract was awarded to Western Pipe & Steel Co., Los Angeles. This situation was reversed at Tacoma, Wash., where steel was apparently slightly lower on one or two projects, but the contract went to concrete interests.

Eastern plate mills are getting comparatively little new business.

SHEETS AND STRIP

. . . Fair volume of orders being booked by mills

DESPITE the large shipments of sheets and strip during the fourth quarter, these products start out the new year with fair promise. There is enough current buying to warrant the conclusion that many consumers did not greatly exceed their normal requirements in the purchases they made at the low prices last October.

Demand in the CHICAGO area is being well maintained. Miscellaneous consumption is accounting for much of the production, with the automobile industry continuing the most important single factor. Some implement and tractor plants in the CHICAGO area have become busier in the past week, and good prospects are reported by washing machine manufacturers. CHICAGO mills can supply cold rolled sheets in three to four weeks.

At PHILADELPHIA autobody stamping plants report improvements in releases since the first of the year and are confident of continued improvement through the first quarter. Additional supplies of steel will be ordered within the next 10 days.

Shipments by CLEVELAND and YOUNGSTOWN mills have returned to the pre-holiday rate as consumers are accepting shipments after the inventory season. Replenishment of exhausted sizes and small orders for immediate use are an important factor in current business.

Total sheet orders at PITTSBURGH did not gain much in the past week. There has been some automotive buying but not in large tonnages. Export orders have been a factor.

In SOUTHERN OHIO orders have increased slightly, but are still below the early December rate. Automobile buying has been disappointing, but prospects are held to be good.

In the NEW YORK district there has been some irregularity in galvanized sheet prices, which is traced to abuse of trade allowances.

Market Sidelights

The Maritime Commission has invited bids on the construction of one 3000-ton diesel-propelled steel cargo ship for the account of the Erie & St. Lawrence Corp., New York. The vessel, which will require about 1000 tons of steel, will be used for inland waterways service. Deadline for filing bids has been fixed for Jan. 24.

* * *

Sales of automobiles in Cleveland and Cuyahoga County for the last four months of 1938 were far in excess of expectations. Actual sales, recorded by the Cleveland Automobile Trade Association, numbered 7508 new machines and 37,947 used cars for a total of 45,455. Dealers had expected total sales would probably be around 28,000 units.

* * *

At the Youngstown Sheet & Tube Company's Campbell mill near Youngstown, 707 tons of sheets and strip went through the cold reduction rolls in an 8-hr. turn Jan. 3. Mill officials believe this to be a new world record. The plant was working chiefly on automotive specifications.

STRUCTURAL STEEL

. . . Mare Island Navy shop, requiring 6000 tons, awarded to American Bridge Co.

STRUCTURAL steel specifications at PITTSBURGH increased somewhat last week, the improvement being due to a release of holiday accumulations. However, a lull in new inquiry is looked for soon as Governmental projects which were supposed to have been started before the year's end are still hanging fire. Public work in Indiana accounting for nearly 4000 tons of shapes heads the list of pending projects around CHICAGO. Scarcely any increase has been seen in private construction, but Chicago fabricators fully expect 1939 to bring out more of this type of work.

In the FAR WEST, an award of structural framework for a large Navy shop at Mare Island, Cal., expected to be slightly less than 6000 tons, was made to the American Bridge Co. General contracts have been officially let for the major portion of the Lake Washington bridge at SEATTLE, which will take about 5200 tons of structural steel. Puget Construction Co., Seattle, will build units of the bridge requiring 3840 tons, and the balance of the shapes tonnage will go into pontoon units for which joint contractors are Puget Sound Bridge & Dredging Co., Seattle; J. H. Pomeroy & Co., San Francisco, and Parker-Schram Co., Portland. The bridge represents the main portion of a highway rerouting project, and bids on the balance will be taken in the future.

The volume of lettings and new projects in the NEW YORK area has tapered sharply from the high levels established in the last two weeks in 1938, and the only noteworthy award in that district during the week involved 1700 tons for several bridges at Red Bank, N. J., to be supplied by Bethlehem Steel Co., and this same company will furnish the steel for the technical and commercial high schools at Auburn, N. Y. Following a spurt in awards during December in the PHILADELPHIA territory, the market there has quieted considerably. Spotty business will probably rule there for several months, or until Pennsylvania and New Jersey highway programs become more active. At Absecon, N. J., a grade elimination, involving 775 tons of shapes and 350 tons of bars, will be rebid on Friday, and the district's largest award

was for 1500 tons for a power house at Baltimore, to be supplied by Belmont Iron Works.

Details of fabricated steel awards and inquiries on page 66.

TUBULAR GOODS

. . . Pipe line of 15,000 tons placed . . . Three mills share

ILLINOIS PIPE LINE CO., associated with the Ohio Oil Co., Findlay, Ohio, has purchased 15,000 tons of 10¾ and 12¾ in. line pipe. The total line approximates 200 miles and the order was divided among National Tube Co., Jones & Laughlin Steel Corp. and Youngstown Sheet & Tube Co. It is understood the greater part of the tonnage will be fabricated in the PITTSBURGH district.

Total tubular sales are on a par with a week ago and the improvement noted in oil-country goods during the latter part of December is still holding. No unusual activity is anticipated in the near future.

REINFORCING BARS

. . . Mills getting specification on recent awards

CONCRETE bar specifications placed with mills at PITTSBURGH are on a par with a week ago and producers anticipate a continuation of recent trends owing to the heavy influx of Government awards. Although both inquiries and awards have increased considerably recently, tonnages involved range from 100 to 400 tons.

Prices are spotty throughout the country and, while some large jobs are being let at prices ranging from the published quotations to $3 a ton off, there are many instances where the projects have gone at a lower figure than the bottom range.

A large number of jobs requiring from 100 to 300 tons of bars are pending in Wisconsin, Illinois, Indiana and Michigan. Other than the CHICAGO subway, few projects are in sight that will take exceptional tonnages. Smaller work, however, is sufficiently important to keep mills and estimators fairly well occupied.

Reports indicate that reinforcing steel for Prado Dam in southern California, about 5300 tons, will be furnished by Columbia Steel Co. of San Francisco. This tonnage, long outstanding, will be awarded by a group of contractors organized as Prado Constructors, Inc., with offices in Los Angeles.

General contracts for 10 of the 11 units of the Lake Washington Bridge at Seattle, involving 11,714 tons, have been awarded by the state toll bridge authority. Five different groups of interests will build the portions requiring reinforced steel, of which the largest is the pontoon section taking 8040 tons. This section of the bridge will be constructed jointly by Puget Sound Bridge & Dredging Co., Seattle; J. H. Pomeroy & Co., San Francisco, and Parker-Schram Co., Portland, Ore.

RAILROAD BUYING

. . . New Haven orders 9000 tons of rails . . . Pennsylvania buys diners

THE first rail order of the new year is from the New York, New Haven & Hartford, which has bought 9000 tons, divided equally between Bethlehem and Carnegie-Illinois. The Spokane, Portland & Seattle Railway is inquiring for 4000 tons of 112-lb. rail. The Southern Pacific is inquiring for prices of rails without stating the specific quantity it will buy.

Railroad car builders are confident that new inquiries for cars will materialize within the next month or two. Meanwhile, the Pennsylvania has ordered five dining cars from the Pullman-Standard Car Mfg. Co., to be made of aluminum, and five from the American Car & Foundry Co., to be made of Cor-Ten steel and five from E. G. Budd Mfg. Co., to be made of stainless steel.

Southern Greyhound Lines, Lexington, Ky., has ordered 20 motor coaches from the a. c. f. Motors Co. Union Pacific will soon purchase over 100,000 tons of 131-lb. rails and accompanying fittings at an estimated cost of $5,000,000. They will be used in relaying 360 miles of track in Nebraska, Kansas and Wyoming.

WIRE PRODUCTS

. . . New Business up considerably at Chicago

TOTAL wire sales at PITTSBURGH are holding up fairly well but merchant wire demand has sagged slightly. Manufacturers' wire sales are on the increase, with support well distributed. Producers look for better activity from jobbers later this month.

CLEVELAND producers report that orders for wire and wire products are following the same trend as other divisions of the steel industry. The bulk of the incoming business is for manufacturers' wire, merchant products being in the customary dead season. Export business has been lighter recently.

New business is up considerably over the same period in December, CHICAGO sellers report.

In the PHILADELPHIA territory no test on the $2.25 jobbers' price for wire nails has yet been made, as buyers placed comparatively heavy specifications at lower levels prior to the year's end. Bookings so far in January for wire have been decidedly better than sellers had anticipated, although a significant turnover is not expected until early March.

Sales of merchant products for the spring trade have been fairly brisk for the last three weeks in NEW YORK. Manufacturers' wire continues active. As a result of recent Government awards for ships, sales of wire rope to shipyards has picked up in the last month.

COLD FINISHED BARS

. . . Automobile buying expected in next few weeks

AUTO buying is expected to materialize late this month or in early February. Mills look for a better volume of buying from home appliance companies than was the case in 1938 but orders from these sources so far this year have been negligible.

MERCHANT BARS

. . . Sales not yet showing much pick up

HOT rolled bar sales at PITTSBURGH are still affected by seasonal factors, but producers expect better buying volume by the end of this month. Automotive specifications will probably increase late this month or early in February. Miscellaneous demand is comparatively slow with better performance anticipated in the near future.

CLEVELAND and YOUNGSTOWN merchant bar sellers report new business, production and shipments comparable to December and expect that this month will finish in close proximity to last month.

. . . CANADA . . .

. . . Outlook in Dominion is for increasing business.

TORONTO, Jan. 10 — While the Canadian iron and steel markets failed to produce new developments in the way of large contracts or orders for forward delivery during the past week, there was noticeable betterment in spot demand, and local interests look for further improvement around the end of this month. The automotive industry is maintaining a steady demand for steel materials and hardware, and prospects are favorable for considerable business from the building trades in the immediate future. The new trade treaty with the United States is expected to result in increased imports from across the line, but this should be much more than offset by Canadian exports to Britain and various other countries. Many Canadian companies open the year with large backlogs and prospective business indicates that operations in the steel industry soon will be marked up to 65 or 70 per cent, and possibly higher.

New interest is developing in the merchant pig iron markets and sales for the past week showed sharp gain over those for the preceding two or three weeks.

While most scrap dealers report limited demand for old materials others state that they are having no difficulty in disposing of their holdings, most of which are going to the mills in the Hamilton district under contract. The Steel Co. of Canada is taking baled sheet scrap in addition to heavy melting steel.

. GREAT BRITAIN .

. . . Consumers slow to place orders despite price reductions.

LONDON, Jan. 10 (*By Cable*)— The British iron and steel market is still quiet. Consumers are showing no eagerness to place business but confidence is still expressed, especially in view of the Government's expanded air raid precautions program.

Cleveland foundry pig iron is now in production on a small scale, but consumers are using scrap where possible owing to its cheaper price. Despite the recent reduction of 12s. 6d., hematite exports sales are virtually impossible. Tees pig iron exports last year amounted to 24,000 tons, being the lowest in this century. Tees ore imports fell 750,000 tons.

British shipbreakers are claiming higher prices for their resultant scrap. This is necessary if they are to compete with the Continent and they are urging the British Iron and Steel Federation, as representing scrap buyers, to pay higher prices, thus assuring a continuity of scrap supplies for the home market.

Tin plate buying is brisker, but unfilled orders are still only about 2,000,000 base boxes. It is understood that Wales is slightly in excess of its quota and it is possible that export permits will be restricted.

The Continental steel market is very quiet, especially in exports. Consumers are adopting great caution owing to the uncertainty of political aspects.

Imports at Philadelphia

PHILADELPHIA — During the past three weeks the following iron and steel imports were received at this port: 20 tons of steel bars, 45 tons of steel forgings, 102 tons of steel tubes, 2 tons of wire rods, 5 tons of ferrochrome and 2 tons of steel wire from Sweden. From Belgium came 89 tons of steel bars, 126 tons of steel bands and 127 tons of structural shapes. From South Africa came 2071 tons of chrome ore; from Czechoslovakia, 500 tons of ferromanganese; from Cuba, 3169 tons of chrome ore; from Russia, 1600 tons of manganese ore; from England, 45 tons of iron ore; from Persia, 1500 tons of iron ore; and from Germany, 5 tons of structural shapes. France shipped to this port 300 tons of ferromanganese and 31 tons of steel bands.

McKeesport Men Return; Wages Being Negotiated

PITTSBURGH—About 2000 workmen have returned to the McKeesport Tin Plate Co. plant this week, while a committee composed of company, SWOC, and Government officials negotiate the management's recent request for wage cuts ranging from 6 to 15 per cent.

General Motors to Build New Diesel Truck Engine

DETROIT—General Motors Corp. Diesel engine division plans to go into production in March on a two-cylinder truck engine for Chevrolet trucks, it has been learned. Production of a 10kw single-cylinder power plant also will get under way shortly.

General Electric Sales Lower in Quarter and Year

SCHENECTADY—Orders received by General Electric Co. during the fourth quarter of 1938 amounted to $63,419,265, compared with $73,997,063 in the final quarter of 1937, a decrease of 14 per cent, President Gerard Swope announced. Orders for the year 1938 were $252,176,223, compared with $379,273,619 for 1937, a decrease of 34 per cent.

Weekly Bookings of Construction Steel

	Week Ended				Year to Date	
	Jan. 10, 1939	Jan. 3, 1939	Dec. 13, 1938	Jan. 11, 1938	1939	1938
Fabricated structural steel awards	19,600	36,100	13,250	15,200	55,700	26,900
Fabricated plate awards	6,900	475	610	3,840	7,375	3,840
Steel sheet piling awards	215	0	2,025	0	215	0
Reinforcing bar awards	10,250	1,400	8,000	12,155	11,650	13,815
Total Letting of Construction Steel..	36,965	37,975	23,885	31,195	74,940	44,555

On the Usefulness of Sky-Hooks

(CONCLUDED FROM PAGE 39)

the tar-spray, and deposit them in a storage room ready for use. The entire cycle is controlled by the man in the cab of the overhead crane from which the grab is slung.

Fig. 11 illustrates the use of a grab bucket in a refuse incinerator plant. In this particular case there is an interesting story back of the installation. The Shaw-Box cranes shown were unusual in that they were built entirely of aluminum-alloys, to secure minimum weight. When the incinerator plant was designed, no provision was made for overhead crane supports. Later it was decided to install four cranes, and under the circumstances, it was essential that they be of extremely light weight. Even the clam shell buckets were constructed of aluminum alloys. The total weight of each crane assembly came to but 13,700 lb., whereas, if they had been built as customary from steel assemblies, each crane would have weighed in excess of 21,700 lb. Each crane is of two-ton capacity and 60 ft. span.

Fig. 12 shows a special lumber handling grab as used in the plant of a Pacific Coast lumber manufacturer. The grab works on the tongs principle, long claws reaching under the load from the vertical posts on each side of the mechanism. The grab is motor-operated. Six Whiting cranes equipped with similar grabs are used in this plant, each of 10-ton capacity and 64 ft. span.

These photographs illustrate but a few of the many types of sky-hooks available for all kinds of overhead handling jobs. Each is, however, fairly typical of a definite class of work. For the man with an unusual handling problem it is safe to say, explore the existing market before attempting to design a special sky-hook. Somewhere, at some time, it is very likely that a connection between the load and the crane hoist-hook has been devised that will meet the special need very well.

CAST IRON PIPE

Montgomery, Ala., closes bids Jan. 17 for pipe line extensions and replacements in water system. Cost about $40,000.

Castle Hill, Iowa, plans about 12,000 ft. for water system, including main line from Cedar Falls, Iowa, where supply will be secured. An election will be held soon to vote bonds. R. B. Slippy Engineering Co., Lafayette Building, Waterloo, Iowa, is consulting engineer.

Campbellsville, Ky., will take bids soon for pipe lines for water system and other waterworks installation. Cost about $35,000. H. K. Bell, McClelland Building, Lexington, Ky., is consulting engineer.

Hamlin, Tex., plans early call for bids for pipe line extensions and improvements in water system, and other waterworks installation. Cost about $145,000. Financing has been arranged through Federal aid. W. A. French is engineer.

St. Paul, Minn., plans pipe line extensions and improvements in water system. Cost about $70,000. Financing has been arranged in part through Federal grant. G. M. Shepard is city engineer.

Constructing Quartermaster, Denver, closes bids Jan. 14 for about 13,000 ft. of cast iron water pipe; also for 340 ft. of black steel pipe, 2000 ft. of pressure pipe for gas mains, 660 ft. of galvanized wrought iron pipe, gate valves, tees, crosses, elbows and other fittings (Circular 6814-37).

Benavides, Tex., plans pipe lines for water system and other waterworks installation. Fund of about $140,000 will be arranged for this and sewerage system. Special election will be held soon to vote bond issue. Garrett Engineering Co., Houston, Tex., is consulting engineer.

Cumberland, Md., plans trunk crosstown pipe line for main water system, connecting existing supply line and Ridgedale reservoir. Cost about $145,400. Financing has been arranged through Federal aid.

Quinlan, Okla., plans pipe lines for water system and other waterworks installation. Bond issue is being arranged and further financing will be carried out through Federal aid. Alexander & Pollard, Terminal Building, Oklahoma City, Okla., are consulting engineers.

United States Engineer Office, New York District, 39 Whitehall Street, New York, asks bids until Jan. 17 for miscellaneous pipe and accessories, and for cast steel flanges (Circular 186).

Parsippany, N. J., plans pipe line extensions in water system and other waterworks installation. Cost about $41,300. H. J. Ahlers, Jones Street, Kenvil, N. J., is consulting engineer.

Pittsville, Wis., plans waterworks system as PWA project to cost about $52,727. A. Lawrie Kurtz, 739 North Broadway, Milwaukee, is consulting engineer.

. . . PIPE LINES . . .

North Dakota Consumers Gas Co., Mandan, N. D., R. R. Wolfer, president, recently organized, plans new welded steel natural gas pipe line from Mandan to Fargo, Jamestown, Hillsboro, Valley City and Grand Forks, N. D., and thence to Crookston, Minn., where line will have terminus. Several lateral lines will be built from points near cities noted to reach about 30 additional communities for gas supply. Steel pipe line distributing systems will be installed in the different municipalities, with control stations and other operating facilities. Company has contracted with Montana-Dakota Utilities Co. for bulk supply and will make connection with high-pressure pipe line of that company at terminal at Mandan. Entire project is estimated to cost $4,254,300 and financing in part will be arranged through Federal aid. Company has applied to Federal Power Commission for permission to construct system, or for an order disclaiming jurisdiction over the utility. A. L. Netcher is secretary of new company.

Bureau of Reclamation, Denver, asks bids until Jan. 24 for steel discharge pipes and flap valves for pumping stations Nos. 1, 2, 3 and 4, Contra Costa Canal, Delta division, Central Valley project, Cal.

Sabinal, Tex., plans early construction of pipe line system for natural gas distribution; also welded steel pipe line from municipality to D'Hanis, Tex., for connection with supply source. A control station will be built in city. A bond issue of $35,000 has been authorized.

Mid-Continent Petroleum Corp., Cosden Building, Tulsa, Okla., has awarded contract to Williams Brothers, Inc., Philtower Building, Tulsa, for new 4-in. welded steel pipe line from Cushing, Okla., to connection with present system, about 21 miles in all, for crude oil transmission.

Hillsboro, Kan., has asked bids for pipe line system for natural gas distribution, including steel pipe line for connection with supply source. Cost close to $50,000. Hefling & Hunter, East Second Street, Hutchinson, Kan., are consulting engineers.

American Liberty Oil Co., First National Bank Building, Dallas, Tex., plans steel pipe lines from wells to new natural gasoline plant in Grapeland, Tex., oil field district, for gas transmission to plant. Site has been acquired for gasoline plant and rights of way are being secured for pipe lines.

Weiser, Idaho, plans about 25,000 ft. of steel pipe to replace present 4 and 6-in. lines for water system. Cost about $60,000. A bond issue of $33,000 has been authorized and additional financing arranged through Federal aid.

Tacoma, Wash., which took bids, with concrete alternates, on 58-in. pipe, involving about 2700 tons of plates if steel were chosen, has awarded project to concrete bidder.

Illinois Pipe Line Co., associated with Ohio Oil Co., Findley, Ohio, has purchased 15,000 tons of 10¾ and 12¾-in. line pipe from National Tube Co., Jones & Laughlin Steel Corp., and Youngstown Sheet & Tube Co. Total line approximates 200 miles.

McKeesport Wage Cut Arbitrated

PITTSBURGH—Question of a 6 to 15 per cent wage cut for McKeesport Tin Plate Co. employees is to be arbitrated by a joint committee under the supervision of a U. S. Department of Labor conciliator. Employees are to work under the old wage scale pending a decision. The McKeesport Company recently invoked the 20-day escape clause in its SWOC contract and asked for a 6 to 15 per cent reduction in wage rates.

Foundry Conference in Milwaukee Feb. 16-17

MILWAUKEE—The second annual regional foundry conference sponsored by the Wisconsin chapter, American Foundrymen's Association, will be held Feb. 16-17 at the Hotel Schroeder in Milwaukee. The Department of Mining and Metallurgy, University of Wisconsin, will cooperate as it did a year ago.

. . . NON-FERROUS . . .

. . . Lead buying tapers . . . Zinc production and stocks rise in December; shipments decline . . . Foreign prices weaken.

NEW YORK, Jan. 10—The copper market, both here and abroad, continues very dull and easy. Domestic sales in the past week averaged about 500 tons a day, with most of this total being accounted for by sales between affiliated fabricating and producing units. Independent interest remains dormant. Domestic producers continue to quote on the basis of 11.25c. per lb., Connecticut Valley, but offerings in the outside market turned softer during the week with some material available at as low as 10.50c. per lb. on Monday, as compared with 10.60c. a week ago. These concessions, however, stirred up very little business. The export price also turned softer during the week, with 10.32c. per lb., c.i.f., usual base ports, being the basis of this morning's business. A week ago the export price was in the neighborhood of 10.47c.

Lead

After almost a month of excellent business, the tapering in demand experienced in the past week was not entirely unexpected. The week's business, which totaled 5600 tons, was fairly well divided between January and February delivery. Domestic prices are firmly established at 4.85c., New York, but the London price continues to drag. On first call this morning spot lead was quoted at 3.05c. per lb., London, as compared with 3.13c. a week ago.

Tin

Dull conditions prevailed all week in the tin market. With absolutely no demand in any direction, price movements were a reflection of changes in sterling exchange. Spot Straits is quoted in New York today at 46.75c. as compared with 46.50c. a week ago. On first call in London today cash standards were priced at £216 10s. and three months metal at £217 10s.

Zinc

The market was moderately active most of the week and prices remain unchanged at 4.89c. per lb., New York. The week's sales of 2974 tons contrasted to the week's shipments of 4996 tons emphasizes the fact that though consumption is proceeding at a fairly regular pace, the softness of the foreign market, together with the uncertainty created by the cut in import duties, makes domestic buyers hesitate to commit themselves forward to any extent. This morning's London price of 2.80c. per lb. on spot supplies compares with 2.83c. a week ago. Domestic slab zinc statistics for December showed an increase in stocks of 5826 tons to 126,604 tons. In December, 1937, reserves were 65,333 tons. Shipments for the month were 38,999 tons, against 43,693 in November and 28,675 in December, 1937. Production increased 4482 tons to 44,825 tons.

Non-Ferrous Average Prices

The average prices of the major non-ferrous metals in December, as based on quotations appearing in THE IRON AGE, were as follows:

	Per Lb.
Electrolytic copper, Conn. Valley	11.25c.
Lake copper, Eastern delivery	11.375c.
Straits tin, spot, New York	46.205c.
Zinc, East St. Louis	4.50c.
Zinc, New York	4.89c.
Lead, St. Louis	4.69c.
Lead, New York	4.84c.

NON-FERROUS PRICES

Cents per lb. for early delivery

	Jan. 4	Jan. 5	Jan. 6	Jan. 7	Jan. 9	Jan. 10
Copper, Electrolytic[1]	11.25	11.25	11.25	11.25	11.25	11.25
Copper, Lake	11.375	11.375	11.375	11.375	11.375	11.375
Tin, Straits, New York	46.50	46.55	46.80	....	46.75	46.75
Zinc, East St. Louis[2]	4.50	4.50	4.50	4.50	4.50	4.50
Lead, St. Louis[3]	4.70	4.70	4.70	4.70	4.70	4.70

[1] Delivered Conn. Valley, deduct ¼c. for New York delivery. [2] Add 0.39c. for New York delivery. [3] Add 0.15c. for New York delivery.

Warehouse Prices

Base per lb., Delivered

	New York	Cleveland
Tin, Straits pig	47.75c.	49.75c.
Copper, lake	12.25c.	12.375c.
Copper, electro	11.50c.	12.375c.
Copper, castings	11.25c.	11.875c.
*Copper sheets, hot-rolled	19.375c.	19.375c.
*High brass sheets	17.31c.	17.31c.
*Seamless brass tubes	20.06c.	20.06c.
*Seamless copper tubes	19.875c.	19.875c.
*Brass rods	12.62c.	12.62c.
Zinc slabs	6.25c.	7.25c.
Zinc sheets, No. 9 casks	10.50c.	12.10c.
Lead, American pig	5.60c.	5.60c.
Lead, bar	6.275c.	8.50c.
Lead, sheets, cut	8.00c.	8.00c.
Antimony, Asiatic	15.00c.	17.75c.
Alum., virgin, 99 per cent plus	22.50c.	22.50c.
Alum., No. 1 remelt., 98 to 99 per cent	19.50c.	19.50c.
Solder, ½ and ½	28.925c.	29.10c.
Babbitt metal, commercial grade	22.75c.	22.50c.

* These prices, which are also for delivery from Chicago warehouses, are quoted with the following percentages allowed off for extras: on copper sheets, 33 1/3; on brass sheets and rods, 40, and on brass and copper tubes, 25.

Old Metals Per Lb., New York

Buying prices are paid by dealers for miscellaneous lots from smaller accumulators. Selling prices are those charged to consumers after the metal has been prepared for their uses.

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible	8.00c.	8.75c.
Copper, hvy. and wire	7.00c.	7.50c.
Copper, light and bottoms	6.25c.	6.50c.
Brass, heavy	4.25c.	4.75c.
Brass, light	3.375c.	4.125c.
Hvy. machine composition	6.125c.	7.625c.
No. 1 yel. brass turnings	4.125c.	4.625c.
No. 1 red brass or compos. turnings	5.875c.	6.50c.
Lead, heavy	3.625c.	4.50c.
Cast aluminum	7.00c.	8.25c.
Sheet aluminum	11.75c.	13.25c.
Zinc	2.25c.	3.50c.

Miscellaneous Non-Ferrous Prices

ALUMINUM, delivered; virgin 99 per cent plus, 20c.-21c. a lb.; No. 12 remelt, No. 2 standard, 19c.-19.50c. a lb. NICKEL, electrolytic, 35c.-36c. a lb. base refinery, lots of 2 tons or more. ANTIMONY, prompt, New York; Asiatic, 14c. a lb., f.o.b.; American, 11.75c. a lb. QUICKSILVER, $77 per flask of 76 lb. BRASS INGOTS, commercial 85-5-5-5, 11c. a lb. lcl.

United Machine Tool Co., manufacturer of tools, dies, jigs and fixtures, recently moved from 335 Tower Street, Union, N. J., to its new plant at 285 Coit Street, Irvington, N. J. S. Shurina heads company.

IRON AND STEEL SCRAP

. . . Prices steady in most districts, with composite unchanged at $14.92 . . . Railroad material stronger at Pittsburgh.

JAN. 10—Trading continues light in most centers, but the market undertone is firm. There has been little or no change in prices. The composite remains at $14.92 for the fifth week. Dealers are offering a little more for No. 1 steel at St. Louis and for No. 2 and flashings at Detroit. Small tonnage sales into consumption at Pittsburgh are in line with previously published prices. On the other hand, prices obtained on railroad lists closed last week justify an advance of 50c. in railroad heavy melting and rail items at Pittsburgh. Railroad lists at Chicago, however, showed no change pricewise over the previous month's offerings.

With scarcely no cast grades on recent export orders and with Nos. 1 and 2 steel none too plentiful, the export markets at all Atlantic ports are strong, with dealers stretching the top range of buying prices at New York.

Pittsburgh

A small-sized tonnage of ordinary No. 1 steel was sold into consumption in the immediate Pittsburgh district last week at $15.50 a ton, but other consuming points in the district continue to pay $16 or better for this grade. These transactions substantiate current quotations on No. 1 heavy melting steel which are unchanged this week at $15.50 to $16 a ton. The railroad heavy melting steel on recent Pennsylvania Railroad list was sold into consumption for about $17 a ton while the heavy melting steel on the Baltimore & Ohio list went to brokers for $16.25 a ton. A small tonnage of railroad heavy melting steel on the Pittsburgh & Lake Erie list went to brokers at slightly over $16 a ton. All these transactions took place in the past week.

Chicago

Trading this week has been very light because of the large group of Chicago brokers and dealers attending the annual Scrap Institute convention in St. Louis. Heavy melting steel still is being quoted from $13.50 to $14. Several railroads sold list last week, all being in accordance with present prices.

Philadelphia

The market is encouraged by an improvement in inquiry for foundry items, but also is anxiously awaiting a revival in interest on the part of district steel mills. The most optimistic, however, look for no important domestic support until early February. Meanwhile, export continues to support the price list here, what with two boats scheduled to take out full cargoes this week. No. 1 steel is none too plentiful, and brokers would likely offer more for this grade if they thought the turnover would be accelerated proportionally. No. 2 steel is comparatively more plentiful, and demands for specialties are very spotty with list prices for such items untested for some time. The movement of the national steel making operating rate over the next several weeks is of course of major importance in establishing scrap sentiment, but at the moment the undercurrent is definitely on the strong side.

Youngstown

Valley mills are receiving scrap on a restricted basis. No large amounts of material are being offered, and with brokers here short on commitments and finding difficulty bringing material from outside areas, the market has a very firm undertone.

Cleveland

Some of the railroad steel on the latest monthly lists brought slightly higher prices than in December, much of the scrap going to domestic markets. Dealers here are finding it hard to bring scrap in from other areas. Local dealers who have bought Detroit scrap for vessel delivery in the spring are much more confident of profit than they were last year at this time.

Buffalo

Mills have released shipment on all outstanding purchases this week and dealers expect necessary replenishment of stock reserves for the new year to create additional demand. Cast scrap is beginning to move again and a few specialties are being sold out of the district.

The quotation $13.75 to $14.75 on No. 1 heavy melting steel, Buffalo, which appeared in the Dec. 22 and 29 issues of THE IRON AGE was a typographical error. The correct quotation for both weeks was $13.75 to 14.25.

St. Louis

The scrap iron market is steady, but prices generally unchanged. The trade is bullish, and several deals with mills are pending. Dealers offerings are light. Railroad lists: Missouri Pacific, 1620 tons; Alton, 892 tons; and Gulf Coast Lines, 813 tons.

Cincinnati

Old materials are sustained by hopes. Southern Ohio consumers indicate a willingness to buy, but are exerting pressure on prices to which dealers refuse to give way. The undercurrent is still strong with probabilities that mills will be forced by need to come nearer to dealer's asking prices. In the meantime, only small amounts change hands and some old contracts are being completed.

Detroit

A stronger undercurrent of sentiment is flowing in this area's scrap market. One broker has increased his buying prices on No. 2 heavy melting steel and flashings by 50c. Other items remain unchanged.

New York

With recent European and Japanese orders calling mostly for Nos. 1 and 2 heavy melting steel and practically no cast grades, prices for the former group are stronger and for the latter, softer. Brokers are now offering up to $12.50 for No. 1 and $11 for No. 2 in truck lots delivered to barges, with larger amounts being paid for sizeable tonnages. Boat loadings continue at an even pace. Shipments of material into eastern Pennsylvania are at low ebb.

Boston

A Phillipsdale, R. I., steel mill is obtaining freight car scrap of the New Haven Railroad from other interests, paying $14.50 and $14 a ton delivered. The American Steel & Wire Co., Worcester, is obtaining some Nos. 1 and 2 steel from the Springfield, Mass., territory. For this material brokers are paying $13 a ton for No. 1 and $12 for No. 2. Ordinarily this material might be shipped to Boston for export, but the freight rate from Springfield to Boston is $1 a ton more than it is from Springfield to Worcester, giving the steel mill an advantage. Dealers, more particularly those in the Providence area, heretofore paying as high as $10 a ton delivered yards for No. 1 automobile scrap, have dropped their price to $8. The extreme top prices for Nos. 1 and 2 steel in the local export market hold at $14 and $13 a ton.

S.A.E. Holding Its Annual Meeting This Week in Detroit

DETROIT—The national annual meeting of the Society of Automotive Engineers is being held this week at the Book-Cadillac Hotel, Detroit. Final sessions will be on Friday. At 21 sessions starting Monday members heard papers and discussions on aircraft, passenger cars, trucks, engines, tires and accessories. One entire day, Wednesday, was devoted to engineering analysis of problems of national defense. Morning sessions told the problems of military land transportation, afternoon sessions dealt with air transport, and the annual banquet audience heard Brigadier General C. T. Harris, Jr., assistant to the Chief of Ordnance, speak on "Industrial Mobilization for National Defense."

W. J. Davidson, general sales manager of the Diesel engine division of General Motors Corp., was installed as president succeeding C. W. Spicer, of Spicer Mfg. Corp.

Iron and Steel Scrap Prices

PITTSBURGH

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel.	$15.50 to $16.00
Railroad hvy. mltng...	16.50 to 17.00
No. 2 hvy. mltng. steel.	14.25 to 14.75
Scrap rails	17.00 to 17.50
Rails 3 ft. and under..	17.50 to 18.00
Comp. sheet steel	15.50 to 16.00
Hand bundled sheets..	14.50 to 15.00
Hvy. steel axle turn..	14.00 to 14.50
Machine shop turn....	9.75 to 10.25
Short shov. turn.....	10.50 to 11.00
Mixed bor. & turn....	8.25 to 8.75
Cast iron borings.....	8.25 to 8.75
Cast iron carwheels...	15.00 to 15.50
Hvy. breakable cast...	12.50 to 13.00
No. 1 cupola cast.....	15.25 to 15.75
RR. knuckles & cplrs.	16.50 to 17.00
Rail coil & leaf springs	17.00 to 17.50
Rolled steel wheels....	17.00 to 17.50
Low phos. billet crops.	18.50 to 19.00
Low phos. punchings.	17.50 to 18.00
Low phos. plate	17.00 to 17.50

PHILADELPHIA

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel.	$15.00 to $15.50
No. 2 hvy. mltng. steel.	13.50
Hydraulic bund., new.	14.50 to 15.00
Hydraulic bund., old..	11.50 to 12.00
Steel rails for rolling.	17.00 to 17.50
Cast iron carwheels...	16.50 to 17.00
Hvy. breakable cast...	16.00
No. 1 cast.....	16.50 to 17.00
Stove plate (steel wks.)	13.00 to 13.50
Railroad malleable ...	15.50 to 16.00
Machine shop turn....	8.50 to 9.00
No. 1 blast furnace....	6.50 to 7.00
Cast borings	6.50 to 7.00
Heavy axle turnings..	10.00 to 10.50
No. 1 low phos. hvy...	16.50 to 17.00
Couplers & knuckles..	16.50 to 17.00
Rolled steel wheels ...	16.50 to 17.00
Steel axles	21.50 to 22.00
Shafting	20.00 to 20.50
Spec. iron & steel pipe	12.00 to 12.50
No. 1 forge fire	11.00 to 11.50
Cast borings (chem.)..	9.50 to 10.00

CHICAGO

Delivered to Chicago district consumers:

	Per Gross Ton
Hvy. mltng. steel	$13.50 to $14.00
Auto. hvy. mltng. steel alloy free	12.00 to 12.50
No. 2 auto. steel	11.50 to 12.00
Shoveling steel	13.50 to 14.00
Factory bundles	12.75 to 13.25
Dealers' bundles	12.00 to 12.50
Drop forge flashings..	**11.50 to 12.00**
No. 1 busheling	12.00 to 12.50
No. 2 busheling, old..	5.75 to 6.25
Rolled carwheels	15.25 to 15.75
Railroad tires, cut....	16.25 to 16.75
Railroad leaf springs..	15.75 to 16.25
Steel coup. & knuckles	15.25 to 15.75
Axle turnings	12.75 to 13.25
Coil springs	16.75 to 17.25
Axle turn. (elec.)	13.75 to 14.25
Low phos. punchings..	15.75 to 16.25
Low phos. plates 12 in. and under	15.25 to 15.75
Cast iron borings	5.25 to 5.75
Short shov. turn.	7.00 to 7.50
Machine shop turn....	7.00 to 7.50
Rerolling rails	17.00 to 17.50
Steel rails under 3 ft..	15.75 to 16.25
Steel rails under 2 ft..	16.25 to 16.75
Angle bars, steel	15.25 to 15.75
Cast iron carwheels...	12.25 to 12.75
Railroad malleable	14.75 to 15.25
Agric. malleable	11.25 to 11.75
	Per Net Ton
Iron car axles	19.50 to 20.00
Steel car axes	19.00 to 19.50
Locomotive tires	15.25 to 15.75
Pipes and flues	9.25 to 9.75
No. 1 machinery cast.	12.25 to 12.75
Clean auto. cast.	12.25 to 12.75
No. 1 railroad cast....	11.25 to 11.75
No. 1 agric. cast.....	10.75 to 11.25
Stove plate	8.25 to 8.75
Grate bars	8.25 to 8.75
Brake shoes	9.25 to 9.75

YOUNGSTOWN

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel.	$15.00 to $15.50
No. 2 hvy. mltng. steel.	13.75 to 14.25
Low phos. plate	15.50 to 16.00
No. 1 busheling	13.50 to 14.00
Hydraulic bundles	14.25 to 14.75
Machine shop turn....	9.75 to 10.25

CLEVELAND

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel.	$14.00 to $14.50
No. 2 hvy. mltng. steel.	13.50 to 14.00
Comp. sheet steel	13.50 to 14.00
Light bund. stampings	11.00 to 11.50
Drop forge flashings..	13.00 to 13.50
Machine shop turn....	7.00 to 7.50
Short shov. turn.....	7.50 to 8.00
No. 1 busheling	13.00 to 13.50
Steel axle turnings....	11.00 to 11.50
Low phos. billet and bloom crops	18.00 to 18.50
Cast iron borings	7.75 to 8.25
Mixed bor. & turn....	7.75 to 8.25
No. 2 busheling	7.75 to 8.25
No. 1 cast	16.50 to 17.00
Railroad grate bars ..	9.50 to 10.00
Stove plate	10.00 to 10.50
Rails under 3 ft.	19.00 to 19.50
Rails for rolling	17.00 to 17.50
Railroad malleable ...	15.50 to 16.00
Cast iron carwheels ..	14.00 to 14.50

BUFFALO

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel.	$13.75 to $14.25
No. 2 hvy. mltng. steel.	11.75 to 12.25
Scrap rails	15.00 to 15.50
New hvy. b'ndled sheets	11.75 to 12.25
Old hydraul. bundles..	10.75 to 11.25
Drop forge flashings...	11.75 to 12.25
No. 1 busheling	11.75 to 12.25
Hvy. axle turnings....	10.50 to 11.00
Machine shop turn....	6.75 to 7.25
Knuckles & couplers..	16.50 to 17.00
Coil & leaf springs....	16.50 to 17.00
Rolled steel wheels....	16.00 to 16.50
Low phos. billet crops.	15.50 to 16.00
Shov. turnings	8.75 to 9.25
Mixed bor. & turn.....	7.50 to 8.00
Cast iron borings	7.50 to 8.00
Steel car axles	16.50 to 17.00
No. 1 machinery cast..	15.50 to 16.00
No. 1 cupola cast.	14.50 to 15.00
Stove plate	13.00 to 13.50
Steel rails under 3 ft..	18.00 to 18.50
Cast iron carwheels...	13.50 to 14.00
Railroad malleable	15.00 to 15.50
Chemical borings	9.00 to 9.50

ST. LOUIS

Dealers' buying prices per gross ton delivered to consumer:

Selected hvy. melting.	$13.25 to $13.75
No. 1 hvy. melting....	13.00 to 13.50
No. 2 hvy. melting....	12.00 to 12.50
No. 1 locomotive tires.	13.50 to 14.00
Misc. stand. sec. rails.	14.50 to 15.00
Railroad springs	15.50 to 16.00
Bundled sheets	7.50 to 8.00
No. 1 busheling	7.50 to 8.00
Cast. bor. & turn.....	3.50 to 4.00
Machine shop turn....	3.50 to 4.00
Heavy turnings	9.50 to 10.00
Rails for rolling.....	17.50 to 18.00
Steel car axles	18.50 to 19.00
No. 1 RR. wrought....	10.50 to 11.00
No. 2 RR. wrought....	12.50 to 13.00
Steel rails under 3 ft..	16.25 to 16.75
Steel angle bars	14.50 to 15.00
Cast iron carwheels...	14.00 to 14.50
No. 1 machinery cast..	15.00 to 15.50
Railroad malleable ...	12.00 to 12.50
No. 1 railroad cast....	12.75 to 13.00
Stove plate	9.00 to 9.50
Grate bars	9.00 to 9.50
Brake shoes	10.75 to 11.25

CINCINNATI

Dealers' buying prices per gross ton at yards:

No. 1 hvy. mltng. steel.	$11.50 to $12.00
No. 2 hvy. mltng. steel.	9.25 to 9.75
Scrap rails for mltng.	15.25 to 15.75
Loose sheet clippings.	6.75 to 7.25
Hydrau. b'ndled sheets	11.00 to 11.50
Cast iron borings	3.50 to 4.00
Machine shop turn....	5.25 to 5.75
No. 1 busheling	8.00 to 8.50
No. 2 busheling	2.75 to 3.25
Rails for rolling	17.50 to 18.00
No. 1 locomotive tires.	14.25 to 14.75
Short rails	18.00 to 18.50
Cast iron carwheels...	12.75 to 13.25
No. 1 machinery cast.	13.50 to 14.00
No. 1 railroad cast....	12.75 to 13.25
Burnt cast	6.75 to 7.25
Stove plate	6.75 to 7.25
Agricul. malleable	11.75 to 12.25
Railroad malleable	14.25 to 14.75
Mixed hvy. cast.....	10.50 to 11.00

BIRMINGHAM

Per gross ton delivered to consumer:

Hvy. melting steel....	$12.50 to $14.00
Scrap steel rails	14.50 to 15.00
Short shov. turnings..	7.50 to 8.10
Stove plate	9.00 to 10.00
Steel axles	15.00 to 16.00
Iron axles	15.00 to 16.00
No. 1 RR. wrought	.... 10.00
Rails for rolling	16.00 to 16.50
No. 1 cast.	.... 14.50
Tramcar wheels	.... 14.00

DETROIT

Dealers' buying prices per gross ton:

No. 1 hvy. mltng. industrial steel	$10.50 to $11.00
No. 2 hvy. mltng. steel.	9.50 to 10.00
Borings and turnings.	5.75 to 6.25
Long turnings	5.50 to 6.00
Short shov. turnings..	6.00 to 6.50
No. 1 machinery cast..	12.25 to 12.75
Automotive cast	13.50 to 14.00
Hvy. breakable cast...	9.75 to 10.25
Hydraul. comp. sheets.	11.75 to 12.25
Stove plate	8.00 to 8.50
New factory bushel...	10.75 to 11.25
Sheet clippings	8.25 to 9.25
Flashings	9.50 to 10.00
Low phos. plate scrap	12.00 to 12.50

NEW YORK

Dealers' buying prices per gross ton on cars:

No. 1 hvy. mltng. steel.	$10.50 to $11.00
No. 2 hvy. mltng. steel.	9.00 to 9.50
Hvy. breakable cast...	11.50 to 12.00
No. 1 machinery cast.	11.50 to 12.00
No. 2 cast	9.50 to 10.00
Stove plate	9.50 to 10.00
Steel car axles	20.00 to 20.50
Shafting	15.50 to 16.00
No. 1 RR. wrought....	11.00 to 11.50
No. 1 wrought long....	9.50 to 10.00
Spec. iron & steel pipe	9.00 to 9.50
Rails for rolling	16.00 to 16.50
Clean steel turnings*..	4.00 to 4.50
Cast borings*	3.50 to 4.00
No. 1 blast furnace...	3.50 to 4.00
Cast borings (chem.)..	9.50 to 10.00
Unprepared yard scrap	6.00 to 6.50
Light iron	3.00 to 3.50
Per gross ton, delivered local foundries:	
No. 1 machn. cast†....	$13.50 to $14.00
No. 2 cast†	10.50 to 11.00

* $1.50 less for truck loads.
† Northern N. J. prices are $2 to $2.50 higher.

BOSTON

Dealers' buying prices per gross ton:

No. 1 hvy. mltng. steel.....	Nominal
Scrap rails	Nominal
No. 2 steel	Nominal
Breakable cast	$10.50 to $10.60
Machine shop turn....	3.38
Mixed bor. & turn..... 2.00 to	2.25
Bun. skeleton long....	8.15
Shafting	15.50 to 15.65
Cast bor. chemical....	5.50 to 5.75
Per gross ton delivered consumers' yards:	
Textile cast	$13.50 to $15.00
No. 1 machine cast....	13.50 to 15.00

PACIFIC COAST

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel.	$12.50 to $14.00
No. 2 hvy. mltng. steel.	11.50 to 13.00

CANADA

Dealers' buying prices at their yards, per gross ton:

	Toronto	Montreal
No. 1 hvy. mltng. steel.	$11.00	$10.00
No. 2 hvy. mltng. steel.	10.00	9.00
Mixed dealers steel....	9.00	8.00
Scrap pipe	5.50	5.00
Steel turnings	4.50	4.00
Cast borings	4.00	3.50
Machinery cast	15.00	14.00
Dealers cast	13.00	12.00
Stove plate	10.00	9.00

EXPORT

Dealers' buying prices per gross ton:

New York, truck lots, delivered, barges

No. 1 hvy. mltng. steel.	$12.00 to $12.50
No. 2 hvy. mltng. steel.	10.50 to 11.00
No. 2 cast	.... 11.00
Stove plate	.... 10.00

Boston on cars at Army Base or Mystic Wharf

No. 1 hvy. mltng. steel.	$13.50 to $14.00
No. 2 hvy. mltng. steel.	12.50 to 13.00
Rails (scrap)	.... 14.00

Philadelphia, delivered alongside boats, Port Richmond

No. 1 hvy. mltng. steel.	$14.50 to $15.00
No. 2 hvy. mltng. steel.	13.50 to 14.00

PRICES ON FINISHED AND SEMI-FINISHED IRON AND STEEL

(Prices are f.o.b. unless otherwise indicated)

SEMI-FINISHED STEEL

Billets, Blooms and Slabs

Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham, Sparrows Point (Rerolling only). Prices delivered Detroit are $2 higher. F.o.b. Duluth, billets only, $2 higher.

	Per Gross Ton
Rerolling	$34.00
Forging quality	40.00

Sheet Bars

Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point, Md.

	Per Gross Ton
Open-hearth or bessemer	$34.00

Skelp

Pittsburgh, Chicago, Youngstown, Coatesville, Pa., Sparrows Point, Md.

	Per Lb.
Grooved, universal and sheared	1.90c.

Wire Rods

(No. 5 to 9/32 in.)

	Per Gross Ton
Pittsburgh, Chicago or Cleveland	$43.00
Worcester, Mass.	45.00
Birmingham	43.00
San Francisco	52.00

Rods over 9/32 in. or 47/64 in., inclusive, $5 a ton over base.

SOFT STEEL BARS

	Base per Lb.
Pittsburgh, Chicago, Gary, Cleveland, Buffalo and Birmingham	2.25c.
Detroit, delivered	2.35c.
Duluth	2.35c.
Philadelphia delivered	2.57c.
New York	2.59c.
On cars dock Gulf ports	2.60c.
On cars dock Pacific ports	2.85c.

RAIL STEEL BARS

(For merchant trade)

Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham	2.10c.
On cars dock Tex. Gulf ports	2.45c.
On cars dock Pacific ports	2.70c.

BILLET STEEL REINFORCING BARS

(Straight lengths as quoted by distributers)

Pittsburgh, Chicago, Gary, Birmingham, Buffalo, Cleveland, Youngstown or Sparrows Pt.	1.90c. to 2.05c.
Detroit, delivered	2.00c. to 2.15c.
On cars dock Tex. Gulf ports	2.25c. to 2.40c.
On cars dock Pacific ports	2.50c.

RAIL STEEL REINFORCING BARS

(Straight lengths as quoted by distributers)

Pittsburgh, Chicago, Gary, Buffalo, Cleveland, Youngstown or Birmingham	1.75c. to 1.90c.
Detroit, delivered	1.85c. to 2.00c.
On cars dock Tex. Gulf ports	2.10c. to 2.25c.
On cars dock Pacific ports	2.35c.

Prices on reinforcing bars have been subject to concessions of $3 a ton or more from above quotations.

IRON BARS

Chicago and Terre Haute	2.15c.
Pittsburgh (refined)	3.60c.

COLD FINISHED BARS AND SHAFTING*

	Base per Lb.
Pittsburgh, Buffalo, Cleveland, Chicago and Gary	2.70c.
Detroit	2.75c.

* In quantities of 10,000 to 19,999 lb.

PLATES

	Base per Lb.
Pittsburgh, Chicago, Gary, Birmingham, Sparrows Point, Cleveland, Youngstown, Coatesville, Claymont, Del.	2.10c.
Philadelphia, del'd	2.15c.
New York, del'd	2.29c.
On cars dock Gulf ports	2.45c.
On cars dock Pacific ports	2.60c.
Wrought iron plates, P't'g	3.80c.

FLOOR PLATES

Pittsburgh or Chicago	3.35c.
New York, del'd	3.71c.
On cars dock Gulf ports	3.70c.
On cars dock Pacific ports	3.95c.

STRUCTURAL SHAPES

	Base per Lb.
Pittsburgh, Chicago, Gary, Buffalo, Bethlehem or Birmingham	2.10c.
Philadelphia, del'd	2.215c.
New York, del'd	2.27c.
On cars dock Gulf ports	2.45c.
On cars dock Pacific ports	2.70c.

STEEL SHEET PILING

	Base per Lb.
Pittsburgh, Chicago or Buffalo	2.40c.
On cars dock Gulf ports	2.85c.
On cars dock Pacific ports	2.90c.

RAILS AND TRACK SUPPLIES

F.o.b. Mill

Standard rails, heavier than 60 lb., per gross ton	$40.00
Angle bars, per 100 lb	2.70

F.o.b. Basing Points

Light rails (from billets) per gross ton	$40.00
Light rails (from rail steel) per gross ton	39.00

	Base per Lb.
Cut spikes	3.00c.
Screw spikes	4.55c.
Tie plates, steel	2.15c.
Tie plates, Pacific Coast ports	2.25c.
Track bolts, to steam railroads	4.15c.
Track bolts to jobbers, all sizes (per 100 counts)	65-5

Basing points on light rails are Pittsburgh, Chicago and Birmingham; on spikes and tie plates, Pittsburgh, Chicago, Portsmouth, Ohio, Weirton, W. Va., St. Louis, Kansas City, Minnequa, Colo., Birmingham and Pacific Coast ports; on tie plates alone, Steelton, Pa., Buffalo; on spikes alone, Youngstown, Lebanon, Pa., Richmond, Va.

SHEETS

Hot Rolled

	Base per Lb.
Pittsburgh, Gary, Birmingham, Buffalo, Sparrows Point, Cleveland, Youngstown, Middletown or Chicago	2.15c.
Detroit, delivered	2.25c.
Philadelphia, delivered	2.32c.
Granite City	2.25c.
On cars dock Pacific ports	2.65c.
Wrought iron, Pittsburgh	4.25c.

Cold Rolled*

Pittsburgh, Gary, Buffalo, Youngstown, Cleveland, Middletown or Chicago	3.20c.
Detroit, delivered	3.30c.
Granite City	3.30c.
Philadelphia, delivered	3.52c.
On cars dock Pacific ports	3.80c.

* Mill run sheets are 10c. per 100 lb. less than base; and primes only, 25c. above base.

Galvanized Sheets, 24 Gage

Pittsburgh, Chicago, Gary, Sparrows Point, Buffalo, Middletown, Youngstown or Birmingham	3.50c.
Philadelphia, delv'd	3.67c.
Granite City	3.60c.
On cars dock Pacific ports	4.00c.
Wrought iron Pittsburgh	6.10c.

Electrical Sheets

(*F.o.b. Pittsburgh*)

	Base per Lb.
Field grade	3.20c.
Armature	3.55c.
Electrical	4.05c.
Special Motor	4.95c.
Special Dynamo	5.65c.
Transformer	6.15c.
Transformer Special	7.15c.
Transformer Extra Special	7.65c.

Silicon Strip in coils—Sheet price plus silicon sheet extra width extra plus 25c. per 100 lb. for coils. Pacific ports add 70c. a 100 lb

Long Ternes

No. 24 unassorted 8-lb. coating f.o.b. Pittsburgh or Gary	3.95c.
F.o.b. cars dock Pacific ports	4.65c.

Vitreous Enameling Stock, 20 Gage*

Pittsburgh, Chicago, Gary, Youngstown, Middletown or Cleveland	3.35c.
Detroit, delv'd	3.45c.
Granite City	3.45c.
On cars dock Pacific ports	3.95c.

TIN MILL PRODUCTS

***Tin Plate**

	Per Base Box
Standard cokes, Pittsburgh, Chicago and Gary	$5.00
Standard cokes, Granite City	5.10

* Prices effective Nov. 10 on shipments through first quarter of 1939.

Special Coated Manufacturing Ternes

	Per Base Box
Granite City	4.40
Pittsburgh or Gary	$4.30

Roofing Terne Plate

(*F.o.b. Pittsburgh*)

(Per Package, 112 sheets, 20 x 28 in.)	
8-lb. coating I.C.	$12.00
15-lb. coating I.C.	14.00
20-lb. coating I.C.	15.00
25-lb. coating I.C.	16.00
30-lb. coating I.C.	17.25
40-lb. coating I.C.	19.50

Black Plate, 29 gage and lighter

Pittsburgh, Chicago and Gary	3.05c.
Granite City	3.15c.
On cars dock Pacific ports, boxed	4.00c.

HOT ROLLED STRIP

(*Widths up to 12 in.*)

	Base per Lb.
Pittsburgh, Chicago, Gary, Cleveland, Middletown, Youngstown or Birmingham	2.15c.
Detroit, delivered	2.25c.

Cooperage Stock

Pittsburgh & Chicago	2.25c.

COLD ROLLED STRIP*

	Base per Lb
Pittsburgh, Youngstown or Cleveland	2.95c.
Chicago	3.05c.
Detroit, delivered	3.05c.
Worcester	3.15c.

* Carbon 0.25 and less.

Commodity Cold Rolled Strip

Pittsburgh, Youngstown, or Cleveland	3.10c.
Detroit, delivered	3.20c.
Worcester	3.50c.

COLD ROLLED SPRING STEEL

		Pittsburgh and Cleveland	Worcester
Carbon	0.26-0.50%	2.95c.	3.15c.
Carbon	.51 .75	4.30c.	4.50c.
Carbon	.76-1.00	6.15c.	6.35c.
Carbon	1.01 to 1.25	8.35c.	8.55c.

WIRE PRODUCTS

Carload lots, f.o.b. Pittsburgh, Chicago, Cleveland and Birmingham)

To Manufacturing Trade

	Per Lb.
Bright wire	2.60c.
Galvanized wire, base	2.65c.*
Spring wire	3.20c.

* On galvanizing wire to manufacturing trade, size and galvanizing extras are charged, the price Nos. 6 to 9 gage, inclusive, thus being 3.15c.

To the Trade

	Base per Keg
Standard wire nails	$2.45
Coated nails	2.45
Cut nails, carloads	3.60

	Base per 100 Lb.
Annealed fence wire	$2.95
Galvanized fence wire	3.35
Polished staples	3.15
Galvanized staples	3.40
Twisted barbless wire	3.20
Woven wire fence, base column.	67
Single loop bale ties, base col...	56
Stand. 2 pt., 12.5 gage barbed cattle wire, per 80 rod spool..	$2.54

Note: Birmingham base same on above items, except spring wire.

Add $4 a ton for Mobile, Ala.; $5 for New Orleans; $6 for Lake Charles to above bases, except on galvanized and annealed merchant fence wire, which are $1 a ton additional in ecah case.

STEEL AND WROUGHT IRON PIPE AND TUBING

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

F.o.b. Pittsburgh only on wrought iron pipe.

Butt Weld

Steel In.	Black	Galv.	*Wrought Iron* In.	Black	Galv.
⅛	..56	36	¼ & ⅜	.+ 9	+30
¼ to ⅜	..59	43½	½	..24	6½
½	..63½	54	¾	..30	13
¾	..66½	58	1 & 1¼	..34	19
1 to 3	..68½	60½	1½	..38	21½
			2	..37½	21

Lap Weld

2	..61	52½	2	..30½	15
2½ & 3	..64	55½	2½ to 3½	31½	17½
3½ to 6	..66	57½	4	..33½	21
7 & 8	..65	55½	4½ to 8.32½		20
9 & 10	..64½	55	9 to 12	..28½	15
11 & 12	..63½	54			

Butt weld, extra strong, plain ends

⅛	..54½	41½	¼ & ⅜	.+10	+43
½ to ⅜	..56½	45½	½	..25	9
½	..61½	53½	¾	..31	15
¾	..65½	57½	1 to 2	..38	22½
1 to 3	..67	60			

Lap weld, extra strong, plain ends

2	..59	51½	2	..33½	18½
2½ & 3		55½	2½ to 4.39		25½
3½ to 6	..66½	59	4½ to 6.37½		24
7 & 8	..65½	56	7 & 8	..38½	24½
9 & 10	..64½	55	9 to 12	..32	20½
11 & 12	..63½	54			

On butt weld and lap weld steel pipe jobbers are granted a discount of 5%. On less-than-carload shipments prices are determined by adding 25 and 30% and the carload freight rate to the base card.

F.o.b. Gary prices are two points lower discount or $4 a ton higher than Pittsburgh or Lorain on lap weld and one point lower discount, or $2 a ton higher, on all butt weld 8 in. and smaller.

Boiler Tubes

Seamless Steel and Lap Weld Commercial Boiler Tubes and Locomotive Tubes. Minimum Wall.

(Net base prices per 100 ft. f.o.b. Pittsburgh in carload lots)

	Seamless Cold Drawn	Seamless Hot Rolled	Lap Weld Hot Rolled
1 in. o.d....13 B.W.G.	$ 9.01	$ 7.82	....
1¼ in. o.d...13 B.W.G.	10.67	9.26	....
1½ in. o.d...13 B.W.G.	11.79	10.23	$9.72
1¾ in. o.d...13 B.W.G.	13.42	11.64	11.06
2 in. o.d.....13 B.W.G.	15.03	13.04	12.38
2¼ in. o.d...13 B.W.G.	16.76	14.54	13.79
2½ in. o.d...12 B.W.G.	18.45	16.01	15.14
2¾ in. o.d...12 B.W.G.	20.21	17.54	16.58
3 in. o.d...12 B.W.G.	21.42	18.59	17.54
3½ in. o.d...12 B.W.G.	22.48	19.50	18.35
3½ in. o.d...11 B.W.G.	28.37	24.62	23.15
4 in. o.d.....10 B.W.G.	35.20	30.54	28.66
4½ in. o.d...10 B.W.G.	43.04	37.35	35.22
5 in. o.d..... 9 B.W.G.	54.01	46.87	44.25
6 in. o.d..... 7 B.W.G.	82.93	71.96	68.14

Extras for less carload quantities:

40,000 lb. or ft. or over	Base
30,000 lb. or ft. to 39.999 lb. or ft.	5%
20,000 lb. or ft. to 29.999 lb. or ft.	10%
10,000 lb. or ft. to 19.999 lb. or ft.	20%
5,000 lb. or ft. to 9,999 lb. or ft.	30%
2,000 lb. or ft. to 4,999 lb. or ft.	45%
Under 2,000 lb. or ft.	65%

CAST IRON WATER PIPE

	Pet Net Ton
*6-in. and larger, del'd Chicago.	$51.00
6-in. and larger, del'd New York	49.00
*6-in. and larger, Birmingham.	43.00
6-in. and larger, f.o.b. dock, San Francisco or Los Angeles....	52.00
F.o.b. dock, Seattle	52.00
4-in. f.o.b. dock, San Francisco or Los Angeles	55.00
F.o.b. dock, Seattle	52.00

Class "A" and gas pipe, $3 extra 4-in. pipe is $3 a ton above 6-in.

Prices for lots of less than 200 tons. For 200 tons and over, 6-in. and larger is $42, Birmingham, and $50 delivered Chicago and 4-in. pipe, $45, Birmingham, and $54 delivered Chicago.

BOLTS, NUTS, RIVETS, SET SCREWS

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

Per Cent Off List

Machine and carriage bolts:	
½ in. & 6 in. and smaller	65, 5 and 5*
Larger and longer up to 1 in.	60, 10 and 5*
1⅛ in. and larger	60, 5 and 5*
Lag bolts	60, 10 and 5
Plow bolts, Nos. 1, 2, 3 and 7	65, 5 and 5
Hot pressed nuts, and c.p.c. and t nuts, square or hex. blank or tapped:	
½ in. and smaller	65 and 5
9/16 in. to 1 in. inclusive.	60, 5 and 5
1⅛ in. and larger	60 and 5

* Less carload lots and less than full container quantity. Less carload lots in full container quantity, an additional 10 per cent discount; carload lots and full container quantity, still another 5 per cent discount.

Semi-fin. hexagon nuts U.S.S.	S.A.E.
½ in. and smaller	65-5 70
9/16 to 1 in.	60-10 65
1⅛ in. and larger	60-5 60-5

In full container lots, 10 per cent additional discount.

Stove bolts in packages, nuts attached	75
Stove bolts in packages, with nuts separate	75 and 12½
Stove bolts in bulk	85

On stove bolts freight is allowed to destination on 200 lb. and over.

Large Rivets

(½-in. and larger)

Base per 100 Lb.

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham $3.40

Small Rivets

(7/16-in. and smaller)

Per Cent Off List

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham .... 65 and 10

Cap and Set Screws

(Freight allowed to destination)

Per Cent Off List

Milled hexagon head, cap screws, 1 in. dia. and smaller	50 and 10
Milled square head set screws, case hardened, 1 in. dia. and smaller	75 and 10
Milled headless set screws, cut thread ¾ in. and smaller	68 and 10
Upset hex. head cap screws U.S.S. or S.A.E. thread 1 in. and smaller	65 and 10
Upset set screws, cup and oval points	73 and 10
Milled studs	57 and 10

Alloy and Stainless Steel

Alloy Steel Blooms, Billets and Slabs

F.o.b. Pittsburgh, Chicago, Canton, Massillon, Buffalo, Bethlehem.

Base price, $56.00 a gross ton.

Alloy Steel Bars

F.o.b. Pittsburgh, Chicago, Buffalo, Bethlehem, Massillon or Canton.

Open-hearth grade, base	2.80c.
Delivered, Detroit	2.90c.

S.A.E. Series Numbers	Alloy Differential per 100 Lb.
200 (1¼% Nickel)	$0.35
2100 (1½% Nickel)	$0.75
2300 (3½% Nickel)	1.55
2500 (5% Nickel)	2.25
3100 Nickel-chromium	0.70
3200 Nickel-chromium	1.85
3300 Nickel-chromium	3.80
3400 Nickel-chromium	3.20
4100 Chromium-molybdenum (0.15 to 0.25 Molybdenum)	0.55
4100 Chromium-molybdenum (0.25 to 0.40 Molybdenum)	0.75
4600 Nickel - molybdenum (0.20 to 0.30 Mo. 1.50 to 2.00 Ni.)	1.10
5100 Chrome steel (0.60-0.90 Cr.)	0.35
5100 Chrome steel (0.80-1.10 Cr.)	0.45
5100 Chromium spring steel	0.15
6100 Chromium-vanadium bar	1.20
6100 Chromium-vanadium spring steel	0.85
Chromium-nickel vanadium	1.50
Carbon-vanadium	0.85

These prices are for hot-rolled steel bars. The differential for most grades in electric furnace steel is 50c. higher. Slabs with a section area of 16 in. and 2½ in. thick or over take the billet base.

Alloy Cold-Finished Bars

F.o.b. Pittsburgh, Chicago, Gary, Cleveland or Buffalo, 3.40c. base per lb. Delivered Detroit, 3.50c., carlots.

CORROSION & HEAT RESISTANT ALLOYS

(Base prices, cents per lb., f.o.b. Pittsburgh)

Chrome-Nickel

	No. 304	No. 302
Forging billets	21.25c.	20.40c.
Bars	25c.	24c.
Plates	29c.	27c.
Structural shapes.	25c.	24c.
Sheets	36c.	34c.
Hot-rolled strip	23.50c.	21.50c.
Cold-rolled strip	30c.	28c.
Drawn wire	25c.	24c.

Straight Chrome

	No. 410	No. 430	No. 442	No. 446
Bars	18.50c.	19c.	22.50c.	27.50c.
Plates	21.50c.	22c.	25.50c.	30.50c.
Sheets	26.50c.	29c.	32.50c.	36.50c.
Hot strip	17c.	17.50c.	23c.	28c.
Cold strip	22c.	22.50c.	28.50c.	36.50c.

TOOL STEEL

High speed	67c.
High-carbon-chrome	43c.
Oil-hardening	24c.
Special	22c.
Extra	18c.
Regular	14c.

Prices for warehouse distribution to all points on or East of Mississippi River are 2c. a lb. higher. West of Mississippi quotations are 3c a lb. higher.

British and Continental

BRITISH

Per Gross Ton
f.o.b. United Kingdom Ports

Ferromanganese, export	Nominal
Tin plate, per base box	20s. 3d.
Steel bars, open hearth.	£10 8s.
Beams, open-hearth	£10
Channels, open-hearth	£10 5s.
Angles, open-hearth	£10
Black sheets, No. 24 gage.	£13
Galvanized sheets, No. 24 gage	£15 15s.

CONTINENTAL

Per Gross Ton, Gold £, f.o.b. Continental Ports

Billets, Thomas	Nominal
Wire rods, No. 5 B.W.G.	£5 10s.
Steel bars, merchant	£5 5s.
Sheet bars	Nominal
Plate ¼ in. and up	£5 7s.
Plate 3/16 in. and 5 mm.	£5 13s.
Sheets ⅛ in.	£5 9s. 6d
Beams, Thomas	£4 18s.
Angles (Basic)	£4 18s.
Hoops and strip, base	£5 12s.

RAW MATERIALS PRICES

PIG IRON

No. 2 Foundry

F.o.b. Everett, Mass.	$22.75
F.o.b. Bethlehem, Birdsboro and Swedeland, Pa., and Sparrows Point, Md.	$22.00
Delivered Brooklyn	24.50
Delivered Newark or Jersey City	23.53
Delivered Philadelphia	22.84
F.o.b. Neville Island, Erie, Pa., Toledo, Chicago, Granite City, Cleveland and Youngstown	21.00
F.o.b. Buffalo	21.00
F.o.b. Detroit	21.00
Southern, delivered Cincinnati	21.06
Northern, delivered, Cincinnati	21.44
F.o.b. Duluth	21.50
F.o.b. Provo, Utah	19.00
Delivered, San Francisco, Los Angeles or Seattle	24.50
F.o.b. Birmingham*	17.38

* Delivered prices on southern iron for shipment to northern points are 38c. a ton below delivered prices from nearest northern basing point on iron with phosphorus content of 0.70 per cent and over.

Malleable

Base prices on malleable iron are 50c. a ton above No. 2 foundry quotations at Everett, Eastern Pennsylvania furnaces, Erie and Buffalo. Elsewhere they are the same, except at Birmingham and Provo, which are not malleable iron basing points.

Basic

F.o.b. Everett, Mass.	$22.25
F.o.b. Bethlehem, Birdsboro, Swedeland and Steelton, Pa., and Sparrows Point, Md.	21.50
F.o.b. Buffalo	20.00
F.o.b. Neville Island, Erie, Pa., Toledo, Chicago, Granite City, Cleveland and Youngstown	20.50
Delivered Philadelphia	22.34
Delivered Canton, Ohio	21.89
Delivered Mansfield, Ohio	22.44
F.o.b. Birmingham	16.00

Bessemer

F.o.b. Buffalo	$22.00
F.o.b. Everett, Mass.	23.75
F.o.b. Bethlehem, Birdsboro and Swedeland, Pa.	23.00
Delivered Newark or Jersey City	24.53
Erie, Pa., and Duluth	22.00
F.o.b. Neville Island, Toledo, Chicago and Youngstown	21.50
F.o.b. Birmingham	22.00
Delivered Cincinnati	22.11
Delivered Canton, Ohio	22.89
Delivered Mansfield, Ohio	23.44

Low Phosphorus

Basing points: Birdsboro, Pa., Steelton, Pa., and Standish, N. Y.	$26.50

Gray Forge

Valley or Pittsburgh furnace	$20.50

Charcoal

Lake Superior furnace	$25.00
Delivered Chicago	28.34

Canadian Pig Iron

Per Gross Ton

Delivered Toronto

No. 1 fdy., sil. 2.25 to 2.75	$26.50
No. 2 fdy., sil. 1.75 to 2.25	25.50
Malleable	26.00
Basic	25.50

Delivered Montreal

No. 1 fdy., sil. 2.25 to 2.75	$27.50
No. 2 fdy., sil. 1.75 to 2.25	27.00
Malleable	27.50
Basic	27.00

FERROALLOYS

Ferromanganese

F.o.b. New York, Philadelphia, Baltimore, Mobile or New Orleans.

Per Gross Ton

Domestic, 80% (carload)	$92.50

Spiegeleisen

Per Gross Ton Furnace

Domestic, 19 to 21%	$28.00
Domestic, 26 to 28%	33.00

Electric Ferrosilicon

Per Gross Ton Delivered; Lump Size

50% (carload lots, bulk)	$69.50*
50% (ton lots in 50 gal. bbl.)	80.50*
75% (carload lots, bulk)	126.00*
75% (ton lots in 50 gal. bbl.)	139.00*

Bessemer Ferrosilicon

F.o.b. Furnace, Jackson, Ohio

Per Gross Ton

10.00 to 10.50%	$30.50

For each additional 0.50% silicon up to 12%, 50c. per ton is added. Above 12% add 75c. per ton.

For each unit of manganese over 2%, $1 per ton additional. Phosphorus 0.75% or over, $1 per ton additional.

Base prices at Buffalo are $1.25 a ton higher than at Jackson.

Silvery Iron

Per Gross Ton

F.o.b. Jackson, Ohio, 5.00 to 5.50%	$24.50

For each additional 0.5% silicon up to 12%, 50c. a ton is added. Above 12% add 75c. a ton. The lower all-rail delivered price from Jackson or Buffalo is quoted with freight allowed. Base prices at Buffalo are $1.25 a ton higher than at Jackson.

Manganese, each unit over 2%, $1 a ton additional. Phosphorus 0.75% or over, $1 a ton additional.

Ferrochrome

Per Lb. Contained Cr., Delivered Carlots, Lump Size, on Contract

4 to 6% carbon	10.50c.*
2% carbon	16.50c.*
1% carbon	17.50c.*
0.10% carbon	19.50c.*
0.06% carbon	20.00c.*

Silico-manganese

Per Gross Ton, Delivered, Lump Size, Bulk, on Contract

3% carbon	$92.75
2.50% carbon	97.75
2% carbon	102.75
1% carbon	112.75

Other Ferroalloys

Ferrotungsten, per lb. contained W del., carloads	$1.75
Ferrotungsten, 100 lbs. and less	2.00
Ferrovanadium, contract, per lb. contained V., delivered	$2.70 to $2.90†
Ferrocolumbium, per lb. contained columbium, f.o.b. Niagara Falls, N. Y., tons lots.	$2.25†
Ferrocarbontitanium, 15 to 18% Ti, 7 to 8% C, f.o.b. furnace carload and contract per net ton	$142.50
Ferrocarbontitanium, 17 to 20% Ti, 3 to 5% C, f.o.b. furnace, carload and contract, per net ton	$157.50
Ferrophosphorus, electric or blast furnace material, in carloads, f.o.b. Anniston, Ala., for 18%, with $3 unitage, freight equalized with Rockdale, Tenn., per gross ton	$58.50
Ferrophosphorus, electrolytic, 23-26% in car lots, f.o.b. Monsanto (Siglo), Tenn., 24%, per gross ton, $3 unitage, freight equalized with Nashville	$75.00
Ferromolybdenum, per lb. Mo. f.o.b. furnace	95c.
Calcium molybdate, per lb. Mo. f.o.b. furnace	80c.

*Spot prices are $5 per ton higher
†Spot prices are 10c. per lb. of contained element higher.

ORES

Lake Superior Ores

Delivered Lower Lake Ports

Per Gross Ton

Old range, Bessemer, 51.50%	$5.25
Old range, non-Bessemer, 51.50%	5.10
Messabi, Bessemer, 51.50%	5.10
Messabi, non-Bessemer, 51.50%	4.95
High phosphorus, 51.50%	4.85

Foreign Ore

C.i.f. Philadelphia or Baltimore

Per Unit

Iron, low phos., copper free, 55 to 58% dry, Algeria	12c.
Iron, low phos., Swedish, average, 68½% iron	12½c.
Iron, basic or foundry, Swedish, aver. 65% iron	11c.
Iron, basic or foundry, Russian, aver. 65% iron	Nominal
Man., Caucasian, washed 52%	31c.
Man., African, Indian, 44-48%	29c.
Man., African, Indian, 49-51%	31c.
Man., Brazilian, 46 to 48½%	28c.

Per Short Ton. Unit

Tungsten, Chinese, Wolframite, duty paid, delivered	$19.50
Tungsten, domestic, scheelite delivered	$18.00 to $19.00
Chrome ore (lump) c.i.f. Atlantic Seaboard, per gross ton: South African (low grade)	$15.00
Rhodesian, 45%	19.00
Rhodesian, 48%	23.00
Turkish, 48-49%	23.00
Turkish, 45-46%	19.00
Turkish, 40-44%	16.00
Chrome concentrates (Turkish) c.i.f. Atlantic Seaboard, per gross ton: 50%	$24.00
48-49%	22.50

FLUORSPAR

Per Net Ton

Domestic washed gravel, 85-5, f.o.b. Kentucky and Illinois mines, all rail	$17.00 to $18.00
Domestic, f.o.b. Ohio River landing barges	18.00
No. 2 lump, 85-5, f.o.b. Kentucky and Ill. mines	18.00
Foreign, 85% calcium, fluoride, not over 5% silicon, c.i.f. Atlantic ports, duty paid	24.50
Domestic No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2½% silicon, f.o.b. Illinois and Kentucky mines	31.50

FUEL OIL

Per Gal.

No. 2, f.o.b., Bayonne	4.25c.
No. 6, f.o.b., Bayonne	2.26c.
No. 5 Bur. Stds., del'd Chicago.	3.25c.
No. 6 Bur. Stds., del'd Chicago.	2.75c.
No. 3 distillate, del'd Cleve'd.	5.50c.
No. 4 industrial, del'd Cleve'd.	5.25c.
No. 5 industrial, del'd Cleve'd.	3.00c.
No. 6 industrial, del'd Cleve'd.	2.75c.

COKE

Per Net Ton

Furnace, f.o.b. Connellsville, Prompt	$3.75
Foundry, f.o.b. Connellsville, Prompt	$4.75 to 5.50
Foundry, by-product, Chicago ovens	10.25
Foundry, by-product, del'd New England	12.50
Foundry, by-product, del'd Newark or Jersey City	10.88 to 11.40
Foundry, by-product, Philadelphia	10.95
Foundry, by-product, delivered Cleveland	10.30
Foundry, by-product, delivered Cincinnati	9.75
Foundry, Birmingham	7.50
Foundry, by-product, del'd St. Louis industrial district	10.75 to 11.00
Foundry, from Birmingham, f.o.b. cars dock Pacific ports	14.75

IRON AND STEEL WAREHOUSE PRICES

PITTSBURGH

Base per Lb.

Plates	3.55c.
Shapes	3.55c.
Soft steel bars and small shapes	3.60c.
**Reinforcing steel bars	2.70c.
Cold finished bars and screw stock	3.95c.
Hot rolled strip	3.75c.
Hot rolled sheets	3.50c.
Galv. sheets (24 ga.) 500 lb. to 1499 lb.	4.50c.
Wire, black, soft annealed	3.15c.
Wire, galv., soft	3.55c.
Track spikes (1 to 24 kegs)	3.75c.
Wire nails (in 100-lb. kegs)	2.65c.

On plates, structurals, bars, strip and hot rolled sheets, base applied to orders of 400 to 1999 lb.

** On reinforcing bars base applies to orders of less than one ton and includes switching and carting charge.

All above prices for delivery within the Pittsburgh switching district.

NEW YORK

Base per Lb.

Plates, ¼ in. and heavier	3.83c.
Structural shapes	3.75c.
Soft steel bars, round	3.94c.
Iron bars, Swed. charcoal	7.50 to 8.25c
Cold-fin. shafting and screw stock:	
Rounds, squares, hexagons	4.39c.
Flats up to 12 in. wide	4.39c.
Cold-rolled strip, soft and quarter hard	3.66c.
Hot-rolled strip, soft O.H.	4.11c.
Hot-rolled sheets (10 ga.)	3.73c.
Galv. sheets (24 ga.)	4.60 to 4.85c.
Long ternes (24 ga.)	5.50 to 6.20c.
Cold-rolled sheets (20 ga.)	
Standard quality	4.90c.
Deep drawing	5.15c.
Stretcher leveled	5.50c.
SAE, 2300, hot-rolled	7.50c.
SAE, 3100, hot-rolled	6.10c.
SAE, 6100, hot-rolled annealed	10.25c.
SAE, 2300, cold-rolled	8.69c.
SAE, 3100, cold-rolled, annealed	7.29c.
Floor plate, ⅛ in. and heavier	5.43c.
Standard tool steel	12.50c.
Wire, black, annealed (No. 9)	4.65c.
Wire, galv. (No. 9)	5.00c.
Open-hearth spring steel	4.75c. to 10.25c.
Common wire nails, per keg in 25 keg lots	$3.25

CHICAGO

Base per Lb.

Plates and structural shapes	3.55c.
Soft steel bars, rounds and angles	3.60c.
Soft steel squares, hexagons, channels and Tees	3.75c.
Hot rolled strip	3.75c.
Floor plates	5.15c.
Hot rolled sheets	3.50c.
Galvanized sheets	4.50c.
Cold rolled sheets	4.45c.
Cold finished carbon bars	4.05c.

Above prices are subject to deductions and extras for quantity and are f.o.b. consumer's plant within Chicago free delivery zone.

CLEVELAND

Base per Lb.

Plates	3.55c.
Structural shapes	3.73c.
Soft steel bars	3.50c.
Reinfor. bars (under 2000 lb.)†	2.55c.
Cold-fin. bars (1000 lb., over)	4.05c.
Hot-rolled strip	3.65c.
Cold rolled sheets	4.70c.
Cold-finished strip	3.35c.
Galvanized sheets (No. 24)	4.62c.
Hot-rolled sheets	3.50c.
Floor plates, 3/16 in. and heavier	5.33c.
*Black ann'l'd wire, per 100 lb.	$3.10
*No. 9 galv. wire, per 100 lb.	3.50
*Com. wire nails, base per keg	2.60
Hot rolled alloy steel (3100)	6.05c.
Cold rolled alloy steel (3115)	6.85c.

* For 5000 lb. or less.
† 500 lb. base quantity.

Prices shown on hot rolled bars, strip, sheets, shapes and plates are for 400 to 1999 lb. Alloy steel, 1000 lb. and over; galvanized sheets, 150 to 1499 lb.; cold rolled sheets, 399 lb. and under.

ST. LOUIS

Base per Lb.

Plates and structural shapes	3.82c.
Bars, soft steel (rounds and flats)	3.87c.
Bars, soft steel (squares, hexagons, ovals, half ovals and half rounds)	4.02c.
Cold fin. rounds, shafting, screw stock	4.32c.
Galv. sheets (24 ga.)	4.77c.
Hot rolled sheets	3.77c.
Galv. corrugated sheets, 24 ga. and heavier*	4.82c.
Structural rivets	5.02c.

* No. 26 and lighter take special prices.

BOSTON

Base per Lb.

Structural shapes, 3 in. and larger	5.85c.
Plates, ¼ in. and heavier	3.85c.
Bars	3.98c.
Heavy hot rolled sheets	3.86c.
Hot rolled sheets	4.21c.
Hot rolled annealed sheets	4.76c.
Galvanized sheets	4.76c.
Cold rolled sheets	4.93c.

The following quantity differentials apply: Less than 100 lb., plus $1.50 per 100 lb.; 100 to 399 lb. plus 50c.; 400 to 1999 lb. base; 2000 to 9999 lb. minus 20c.; 10,000 to 39,999 lb. minus 30c.; 40,000 lb. and over minus 40c.

BUFFALO

Plates	3.77c.
Floor plates	5.40c.
Struc. shapes	3.55c.
Soft steel bars	3.60c.
Reinforcing bars (20,000 lb. or more)	2.05c.
Cold-fin. flats, squares, rounds, and hex.	4.05c.
Hot-rolled sheets, 3/16 x 14 in. to 48 in. wide incl. also sizes No. 8 to 30 ga.	3.50c.
Galv. sheets (24 ga.)	4.50c.
Bands and hoops	3.97c.

NEW ORLEANS

Base per Lb.

Mild steel bars	4.20c.
Reinforcing bars	3.24c.
Structural shapes	4.10c.
Plates	4.10c.
Hot-rolled sheets, No. 10	4.35c.
Steel bands	4.75c.
Cold-finished steel bars	5.10c.
Structural rivets	4.85c.
Boiler rivets	4.85c.
Common wire nails, base per keg	3.55
Bolts and nuts, per cent off list	60

REFRACTORIES PRICES

Fire Clay Brick

Per 1000 f.o.b. Works

Super-duty brick, at St. Louis	$60.80
First quality Pennsylvania, Maryland, Kentucky, Missouri and Illinois	47.50
First quality, New Jersey	52.50
Second quality, Pennsylvania, Maryland, Kentucky, Missouri and Illinois	42.75
Second quality, New Jersey	49.00
No. 1, Ohio	39.90
Ground fire clay, per ton	7.10

Silica Brick

Per 1000 f.o.b. Works

Pennsylvania	$47.50
Chicago District	56.05
Birmingham	47.50
Silica cement per net ton (Eastern)	8.55

Chrome Brick

Net per Ton

Standard f.o.b. Baltimore, Plymouth Meeting and Chester	$47.00
Chemically bonded f.o.b. Baltimore, Plymouth Meeting and Chester, Pa.	47.00

Magnesite Brick

Net per Ton

Standard f.o.b. Baltimore and Chester	$67.00
Chemically bonded, f.o.b. Baltimore	57.00

Grain Magnesite

Net per Ton

Imported, f.o.b. Baltimore and Chester, Pa. (in sacks)	$45.00
Domestic, f.o.b. Baltimore and Chester, in sacks	40.00
Domestic, f.o.b. Chewelah, Wash. (in bulk)	22.00

PHILADELPHIA

Base per Lb.

*Plates, ¼-in. and heavier	3.40c.
*Structural shapes	3.40c.
*Soft steel bars, small shapes, iron bars (except bands)	3.60c.
‡Reinforc. steel bars, square and deformed	2.61c.
Cold-finished steel bars	4.36c.
*Steel hoops	4.10c.
*Steel bands, No. 12 and 3/16 in. incl.	3.60c.
*Spring steel	4.75c.
†Hot-rolled anneal. sheets	3.10c.
†Galvanized sheets (No. 24)	4.50c.
*Diam. pat. floor plates, ¼ in.	5.00c.

These prices are for delivery in Philadelphia trucking area.

*Base prices subject to deduction on orders aggregating 4000 lb. or over.

†For 25 bundles or over.

‡For one to five tons.

BIRMINGHAM

Bars and bar shapes	$3.85 base	
Structural shapes and plates	3.75 "	
Hot rolled sheets No. 10 ga.	3.80 "	
Hot rolled sheets No. 24 ga.	4.40 "	3500 lb. and over
Galvanized sheets No. 24 ga.	5.05 "	3500 lb. or more
Strip	4.05 "	
Reinforcing bars	3.85 "	
Floor plates	5.96 "	
Cold finished bars	4.91 "	
Machine and carriage bolts	50 & 10 off list	
Rivets (structural)	$4.60 base	

On plates, shapes, bars, hot-rolled strip heavy hot-rolled sheets, the base applies on 400 to 3999 lb. All prices are f.o.b. consumer's plant.

PACIFIC COAST

Base per Lb.

	San Francisco	Los Angeles	Seattle
Plates, tank and U. M.	4.00c.	4.00c.	4.05c.
Shapes, standard	4.00c.	4.00c.	4.05c
Soft steel bars	4.05c.	4.00c.	4.30c
Reinforcing bars, f.o.b. cars dock Pacific ports	2.675c.	open.	2.975c.
Hot-rolled sheets (No. 10)	4.00c.	4.20c.	3.95c.
Galv. sheets (No. 24 and lighter)	5.15c.	5.05c.	5.25c.
Galv. sheets (No. 22 and heavier)	5.40c.	5.05c.	5.25c.
Cold-finished steel			
Rounds	6.55c.	6.60c.	7.10c.
Squares and hexagons	7.80c.	7.85c.	7.10c.
Flats	8.30c.	8.35c.	8.10c.
Common wire nails—base per keg less carload	$3.20	$3.05	$3.00

All items subject to differentials for quantity.

ST. PAUL

Base per Lb.

Mild steel bars, rounds	4.10c.
Structural shapes	4.00c.
Plates	4.00c.
Cold-finished bars	4.83c.
Hot-rolled annealed sheets, No. 24	4.75c.
Galvanized sheets, No. 24	5.00c.

On mild steel bars, shapes and plates the base applies on 400 to 14,999 lb. On hot-rolled sheets, galvanized sheets and cold-rolled sheets base applies on 15,000 lb. and over. Base on cold-finished bars is 1000 lb. and over of a size.

MEMPHIS

Base per Lb.

Mild steel bars	4.01c.
Shapes, bar size	4.01c.
Iron bars	4.01c.
Structural shapes	3.96c.
Plates	3.96c.
Hot-rolled sheets	3.91c.
Galvanized sheets, No. 24	5.26c.
Steel bands	4.16c.
Cold-drawn rounds	4.61c.
Cold-drawn flats, squares, hexagons	6.61c.

PLANT EXPANSION AND EQUIPMENT BUYING

NORTH ATLANTIC

Lambert Meter Co., Bush Terminal Building No. 4, Brooklyn, manufacturer of gas meters and parts, has purchased plant on West Front Street, Plainfield, N. J., about 150,000 sq. ft. of floor space, and will improve for new works. Present plant will be removed to new location, now scheduled for early next fall and production concentrated there.

American Agricultural Chemical Co., 50 Church Street, New York, commercial fertilizers, etc., plans one-story factory branch, storage and distributing plant at Syracuse, N. Y. Cost over $50,000 with equipment.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Jan. 17 for bronze steam hose, with couplings (Schedule 5311) for Brooklyn Navy Yard; three high-speed steel cutters and saws (Schedule 5319); until Jan. 20, composition gate valves (Schedule 5334) for Brooklyn and Philadelphia yards.

Porocel Corp., recently organized subsidiary of American Cyanamid & Chemical Corp., 30 Rockefeller Plaza, New York, has let general contract to G. W. May, 4501 Asher Street, Little Rock, Ark., for initial unit of new plant at Little Rock, for processing bauxite ore, comprising main one-story mill and smaller units for storage, distribution, etc. Cost reported over $100,000 with equipment.

Signal Corps Procurement District, Army Base, Fifty-eighth Street and First Avenue, Brooklyn, asks bids until Jan. 30 for 10,500 knives (Circular 133).

Johns-Manville Corp., 22 East Fortieth Street, New York, manufacturer of building products, has taken long-term lease of former car shops of Boston & Maine Railroad at North Billerica, Mass., totaling close to 109,000 sq. ft. of floor space, for branch plant for production of recently developed insulating materials for use in fireproof ship construction.

Schori Process Corp., 8-11 Forty-third Road, Long Island City, manufacturer of special processed products for covering metals, has leased one-story building at Forty-third Road and Ninth Street for expansion.

United States Engineer Office, 39 Whitehall Street, New York, asks bids until Jan. 17 for marlin-covered wire rope, and two lengths of plow steel wire rope (Circular 189).

Port Quartermaster, New York Port of Embarkation, Brooklyn, asks bids until Jan. 16 for one 54-in. boiler, with lagging, jacket, etc. (Circular 626-15).

Andrew Jergens Co., 2535 Spring Grove Avenue, Cincinnati, manufacturer of soaps, etc., is arranging for purchase of about 38 acres from Belleville Copper Rolling Mills, Belleville, N. J., for Eastern branch plant. It will consist of one and multi-story units aggregating 300,000 sq. ft. of floor space, with facilities for employment of about 1200 persons. Cost close to $1,000,000 with equipment.

Public Service Electric & Gas Co., Public Service, Terminal, Newark, N. J., has authorized appropriation of $23,500,000 for expansion and improvements in power plants and system, a considerable part of fund to be expended in 1939. Work will include extensions in steam-electric generating station at Burlington, N. J., with installation of new 100,000-kw. turbo-generator unit and accessories, high-pressure boilers and auxiliary equipment; expansion in gas generating plant of Central Gas Works, Raritan, N. J.; modernizing of Marion steam-electric power plant, including switching station; additional transmission and distributing lines, and power substations in Elizabeth, N. J., and other areas, also underground conduit lines in city districts. Projects noted will represent an investment in excess of $16,000,000.

Commanding Officer, Ordnance Department, Frankford Arsenal, Philadelphia, asks bids until Jan. 16 for three trim machines for bullet jackets, cal. 0.30 ball (Circular 579), three vertical presses, second draw, bullet jacket, cal. 0.30 ball (Circular 578), one motor-driven, vertical six-spindle wood boring machine, universal or equal, hydraulic feed (Circular 621).

Textile Machine Works, Inc., Reading, Pa., manufacturer of knitting machines and parts, and other textile mill machinery, plans one-story addition, for which superstructure will begin this month. Cost close to $100,000 with equipment.

Glant & Co., 328 North Randolph Street, Philadelphia, manufacturers of paper mill supplies, plan rebuilding part of plant recently destroyed by fire. Loss over $75,000 with equipment.

BUFFALO DISTRICT

Kilian Mfg. Corp., North Franklin and Frederick Streets, Syracuse, N. Y., manufacturer of ball bearings, casters, etc., plans early call for bids on general contract for one-story addition. Cost close to $50,000 with equipment. Merton E. Granger, Empire Building, is architect.

Buffalo Mill Supply Co., 210-12 Main Street, Buffalo, is considering early rebuilding part of six-story plant recently destroyed by fire. Loss close to $100,000 with equipment.

United States Engineer Office, Binghamton, N. Y., asks bids until Jan. 16 for one hydraulic compression testing machine, capacity not less than 60,000 lb. (Circular 18).

NEW ENGLAND

Worcester Wire Works Division of National-Standard Co., Palmer Street, Worcester, Mass., manufacturer of steel wire products, has let general contract to Fiske-Carter Construction Co., 8 Norwich Street, for one-story addition, 35 x 150 ft. Cost close to $50,000 with equipment. F. H. Cutting, Pearl Street, is architect.

Commanding Officer, Ordnance Department, Watertown Arsenal, Watertown, Mass., asks bids until Jan. 20 for four industrial trucks (Circular 391).

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Jan. 17 for two ram-type universal turret lathes with equipment (Schedule 5294), one heavy-duty radial drill (Schedule 5213) for Portsmouth, N. H., Navy Yard, all motor-driven.

Commanding Officer, Ordnance Department, Springfield Armory, Springfield, Mass., asks bids until Jan. 16 for one automatic drilling, milling and profiling machine, with special multiple spindle (Circular 219), two automatic, motor-driven small milling machines (Circular 225).

Barbour Stockwell Co., Cambridge, Mass., is erecting a one-story machine shop to cost $10,000 without equipment. Lester C. Gustin, 5 Lakeview Terrace, Winchester, Mass., is contractor.

WASHINGTON DIST.

Chemical Warfare Service, Edgewood Arsenal, Edgewood, Md., asks bids until Jan. 19 for 2-in. lubricated plug, acid steel valves, and for 13 1-in. valves, similar type (Circular 195).

General Purchasing Officer, Panama Canal, Washington, asks bids until Jan. 20 for equipment for a diesel engine-electric power plant, including main switchgear assembly, auxiliary switchgear assembly, exhaust silencer; also for one 30-ton bridge-type crane, motor-driven centrifugal sump pump, bus support insulators and 16,280 ft. of copper cable (Schedule 3414).

Bureau of Yards and Docks, Navy Department, Washington, asks bids until Jan. 18 for superstructure for one-story addition to structural shop, 240 x 300 ft., at Norfolk Navy Yard, Portsmouth, Va. (Specifications 8997); four 600-lb. oil-fired boilers, with air preheaters, draft fans, oil burners, structural supports, boiler auxiliaries and combustion control equipment for Pearl Harbor, T. H., Navy Yard (Specifications 9074); until Jan. 25, four 50-ton traveling jib cranes, one gasoline-electric operated and others diesel-electric operated, for installation at Boston, Philadelphia, Puget Sound and Mare Island Navy yards respectively (Specifications 9003).

Glenn L. Martin Co., Middle River, Baltimore, airplanes and parts, plans new airfield on 500-acre tract adjoining plant, with hangars, shops and other structures. Cost over $200,000 with equipment.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Jan. 17 for one metal shaper (Schedule 5293) for Boston Navy Yard; grinding machine (Schedule 5261), hydraulic grinder (Schedule 5262), snagging grinder and tools (Schedule 5263), planer and jointer (Schedule 5270), all motor-driven, for Eastern and Western yards; turbine-driven forced draft blowers (Schedule 5052) for various yards; drill press and one set of tools and equipment (Schedule 5177); until Jan. 20, two motor-driven, bench-type speed lathes (Schedule 5320) for Alexandria, Va.

SOUTH ATLANTIC

Monarch Elevator & Machine Co., 431 Morehead Avenue, Greensboro, N. C., manufacturer of elevators and other mechanical equipment, plans new one-story plant for increase in present capacity. Cost over $45,000 with equipment.

City Council, High Point, N. C., E. M. Knox, city manager, asks bids until Jan. 16 for three hydraulic turbines and electric generator units, with auxiliary equipment, each 7000-kw. capacity, for installation in new municipal hydroelectric generating plant on Yadkin River, about 26 miles from city. Bids will be asked soon for power house and power dam; power substation and switchyard structures; transmission line to city and distributing lines in municipality. Entire project will cost $6,500,000. Financing has been arranged through Federal aid. Murray & Flood, Inc., 369 Lexington Avenue, New York, is consulting engineer.

SOUTH CENTRAL

Todd-Johnson Dry Docks, Inc., New Orleans, plans early rebuilding part of dry docks and shipyard on Mississippi River, opposite New Orleans, recently destroyed by fire, including three dry dock sections, part of 750-ft. wharf, boiler house and other structures. Loss close to $200,000 with equipment.

Coca-Cola Bottling Co., Harlan, Ky., has let general contract to Pope & Cawood Lumber Co., Harlan, for two-story addition to mechanical-bottling plant. Cost over $40,000 with equipment. D. E. Perkins, Harlan, is architect.

Godchaux Sugars, Inc., Masonic Temple Building, New Orleans, has asked bids on general contract for one-story addition to cane sugar mill at Raceland, La., 100 x 145 ft., including improvements in present plant. Cost over $80,000 with equipment. George P. Rice, Baronne Building, New Orleans, is consulting engineer.

Gulf, Mobile & Northern Railroad Co., Mobile, Ala., is considering rebuilding part of engine house and shops at Louisville, Miss.,

recently destroyed by fire. Loss over $75,000 with equipment.

Coca-Cola Bottling Co., Jefferson Street, Montgomery, Ala., has let general contract to Bear Lumber Co., 400 Lee Street, for one-story addition to present two-story mechanical-bottling plant, and improvements in present works. Cost close to $100,000 with equipment.

SOUTHWEST

John C. Kupferle Foundry Co., 2822 North First Street, St. Louis, manufacturer of plumbers' brass goods and other castings, has asked bids on general contract for one-story addition, 46 x 60 ft. Cost close to $40,000 with equipment.

Board of Education, Sixth and Osage Streets, Bartlesville, Okla., has let general contract to Charles M. Dunning, 420 North Hudson Street, Oklahoma City, for two-story manual training school on Country Club Road, at $399,299, exclusive of equipment. Arthur Gorman, 115 East Eighteenth Street, is architect.

Jesco Lubricants, Inc., 1437 Gentry Street, North Kansas City, Mo., plans two-story and basement addition. Cost over $40,000 with equipment. Work is scheduled to begin early in spring.

Lincoln Creosoting Co., Benton Road, Shreveport, La., plans new creosoting plant near Heber Springs, Ark., where large tract has been acquired, to comprise several one-story buildings, tank house, power station, pumping plant and other units, with conveying, loading and other mechanical-handling equipment. Cost about $100,000 with equipment.

Board of Education, Library Building, Kansas City, Kan., has asked bids on general contract for two-story manual training division to Northwest Junior High School, 70 x 150 ft. Cost over $100,000 with equipment. Joseph W. Radotinsky, Commercial National Bank Building, is architect.

Union Bottling Works, Inc., 610 Buford Street, Beaumont, Tex., has let general contract to J. Gebbia Co., 2180 Magnolia Street, for one-story mechanical-bottling plant, 60 x 225 ft., to replace present works. Cost about $50,000 with equipment.

Atlantic Refining Co., Port Arthur, Tex., plans rebuilding part of local oil refinery recently destroyed by fire, including polymerization unit. Loss about $180,000 with equipment. Main offices are at 260 South Broad Street, Philadelphia.

WESTERN PA. DIST.

Pennsylvania Coal & Coke Co., Marstellar (Cambria County) Pa., plans rebuilding tipple at local coal mines recently destroyed by fire together with other mine equipment. Loss over $45,000. Main offices are at 70 East Forty-fifth Street, New York.

Board of Education, 1612 Maple Street, Homestead, Pa., plans manual training department in new two-story and basement Junior-Senior High School, for which general contract has just been let to W. S. Miller Co., 2565 Fifth Avenue, Pittsburgh. Cost about $560,000 with equipment. H. Lamont Button and Paul F. McLean, 119 East Montgomery Avenue, Pittsburgh, are architects.

OHIO AND INDIANA

Union Metal Mfg. Co., 1400-32 Maple Avenue, N.E., Canton, Ohio, manufacturer of metal lighting standards and other metal columns and posts, has let general contract to R. H. Chapin, 110 Eleventh Street, N.E., for one-story addition, 60 x 340 ft. Cost close to $100,000 with equipment.

Wheeling Corrugating Co., Wheeling, W. Va., has established temporary factory branch at 370 West Broad Street, Columbus, Ohio, pending rebuilding of local plant of Huttig Sash & Door Co., in which both companies jointly occupied space, recently destroyed by fire with loss of about $200,000. Contract for reconstruction has been let to Henry McCleary Timber Co., Columbus. When building is ready for occupancy Wheeling company will remove to that location for factory branch, storage and distributing plant.

Contracting Officer, Material Division, Air Corps, Wright Field, Dayton, Ohio, asks bids until Jan. 17 for one precision-type toolroom lathe (Circular 516), carburetor assemblies (Circular 509); until Jan. 18, rigger's chair and tackle assemblies (Circular 515); until Jan. 19, 280 wheel assemblies and 148 brake assemblies (Circular 499); until Jan. 30, 132 oil pressure gage assemblies and 132 fuel pressure gage assemblies (Circular 510).

Compressed Industrial Gases, Inc., 1400 North Fares Avenue, Evansville, Ind., has let general contract to A. G. Ryan & Sons, Furniture Building, for one-story plant unit on adjoining site, for acetylene gas production, with tank facilities for storage and distribution. Cost about $100,000 with equipment. Main offices of company are at 221 North LaSalle Street, Chicago.

MICHIGAN DISTRICT

Diesel Engine Division, General Motors Corp., 13400 Outer Drive, Detroit, has let general contract to Darin & Armstrong, Inc., 2041 Fenkel Street, for one-story addition. Cost over $80,000 with equipment.

City Council, Sturgis, Mich., asks bids until Jan. 16 for diesel engine-generator unit and auxiliary equipment for installation in municipal electric power plant. Cost about $150,000. Ayres, Lewis, Norris & May, Wolverine Building, Ann Arbor, Mich., are consulting engineers.

City Council, Bay City, Mich., asks bids until Jan. 17 for an electric power substation for municipal electrical system. Ayres, Lewis, Norris & May, Wolverine Building, Ann Arbor, Mich., are consulting engineers. T. Harry Nelson is city manager.

MIDDLE WEST

Hump Hairpin Mfg. Co., 1918 South Prairie Avenue, Chicago, has let general contract to Carl E. Erickson & Co., Inc., 2847 North Clark Street, for three-story and basement addition to present one-story plant, 70 x 170 ft. Cost close to $100,000 with equipment. Alfred S. Alschuler, 28 East Jackson Boulevard, is architect.

Bureau of Reclamation, Denver, asks bids until Jan. 20 for four 8-ton, single motor, double-girder, overhead electric traveling cranes, with hand-geared bridge travel, hand-geared trolley and motor-operated hoist (Specifications 4-47418-A); until Jan. 25, one 35,000-lb. gantry crane for raising and lowering bulkhead gates at Seminoe dam, Kendrick, Wyo., project (Specifications 1171-D).

Paxton & Vierling Iron Works, Inc., Omaha, Neb., has approved plans for four one-story additions, comprising steel plant unit, 120 x 160 ft.; material building, 80 x 500 ft.; machine shop, 40 x 280 ft., and foundry, 70 x 250 ft. Cost over $200,000 with equipment.

Western Oil & Fuel Co., 227 Colfax Avenue North, Minneapolis, Minn., plans new bulk oil storage and distributing plant at Red Wing, Minn., to include main one-story building with smaller structures, pumping station, steel storage tanks and other facilities. Cost over $40,000 with equipment.

Superintendent of Public Buildings, State House, Denver, has low bid on general contract from Dutton, Kendall & Hunt, Inc., Denver, for one-story mechanical shop and power house for State Capitol group. Cost about $300,000 with equipment. Gordon D. White, 615 Columbine Street, is architect.

Board of Regents, University of Wisconsin, Madison, Wis., asks bids until Jan. 17 for boiler units and accessories, stokers, heaters, pumps, compressor and auxiliary equipment for power house. State Bureau of Engineering, Division of Architecture, Madison, is architect.

Wisconsin Power Co-Operative, Chippewa Falls, Wis., plans additional unit to generating plant of hydraulic type costing $200,000, which sum has been allotted by Rural Electrical Administration.

Appleton Wire Works, 705 North Law Street, Appleton, Wis., specializing in manufacture of wire cloth and screens for paper mills, has started work on two factory wings, 125 x 25 ft., and 20 x 50 ft., costing about $25,000 with equipment.

Milwaukee Coca-Cola Bottling Co., 1630 North Eleventh Street, Milwaukee, has acquired acreage at 424 East Capital Drive for new plant, 160 by 162 ft., with garage, 70 x 160 ft., to cost $300,000 with bottling machinery, motors and other equipment, to be ready for occupancy in fall.

Marathon Paper Mills Co., Menasha, Wis., contemplates construction of new factory building and office, 110 x 300 ft., two stories and basement, designed by Frank Gruper, chief engineer, to cost about $200,000 with equipment.

PACIFIC COAST

Lockheed Aircraft Corp., Burbank, Cal., has let general contract to H. W. Baum, 219 West Seventh Street, Los Angeles, for one-story addition. Cost over $60,000 with equipment. John and Donald B. Parkinson, Title Insurance Building, Los Angeles, are architects.

Bureau of Yards and Docks, Navy Department, Washington, asks bids until Jan. 25 for superstructure for one-story foundry, 180 x 408 ft., at Mare Island Navy Yard, Cal. (Specifications 9062); also bids (no closing date stated) for 34 ordnance buildings at naval ammunition depot, Hawthorne, Nev., including cranes and hoists, heating and distributing piping, and other equipment and facilities (Specifications 8966).

Board of Education, Riverside, Cal., plans one-story vocational shop at Chemawa Junior High School, for which bids will be asked soon on general contract. Cost about $79,000, exclusive of equipment. G. Stanley Wilson, 3616 Main Street, is architect.

Puget Sound Shipbuilding Co., West Marginal Way and Idaho Street, Seattle, has taken over former plant of Wallace Bridge & Structural Steel Co., location noted, and will convert for a shipbuilding and repair works. New shops and other structures will be erected. Cost close to $300,000 with equipment.

Bureau of Reclamation, Denver, asks bids until Jan. 18 for one steel surge tank and discharge-pipe liner for discharge pipe at Ontario-Nyssa pumping plant, Owyhee project, Oregon-Idaho (Specifications 1165-D).

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Jan. 17 for one motor-driven universal milling machine (Schedule 5269), two oil-burning tilting crucible furnaces (Schedule 5272), two heavy-duty tractors, commercial standard wheeled-type, with low-pressure tires (Schedule 5280), six industrial shop trucks, gasoline engine-driven (Schedule 5279) for San Diego Naval Air Station.

FOREIGN

Metropolitan-Vickers Electrical Co., Tafford Park, Manchester, England, manufacturer of electrical equipment, plans one-story addition for production of aircraft, including manufacture of certain parts and for assembling. Cost over $200,000 with equipment.

Public Works Department, Wellington, New Zealand, asks bids until Feb. 14 for one 80-ton electric traveling crane, four-motor type, for installation in Waikaremoana power station (Section 177), quantity of 11,000-volt switchgear for Southland power project (Section 72), remote control equipment for Fraser River dam (Section 811).

Fisk Rubber Corp., Chicopee Falls, Mass., has acquired property with several buildings at Viskafors, near Gothenburg, Sweden, for new branch mill for manufacture of tires and tubes, also line of mechanical rubber goods. It is scheduled to be ready in spring. Fisk Scandinavian Rubber Corp. has been formed as a subsidiary to operate mill.

THIS WEEK'S MACHINE ...TOOL ACTIVITIES...

. . . Increase in volume of inquiries points to active year ahead . . . Foreign orders and ordnance work in the United States still furnishes backlog of machine tool plant activity.

Orders at Even Level Cincinnati Builders Report

CINCINNATI—The new year so far has produced nothing new in the local machinery market. Bookings made in the past week, virtually all in single unit quantities, were about equal to those of the preceding week. The stubborn adherence of domestic demand to recently attained levels adds a strong undercurrent to the market. This, combined with the large number of propositions now pending, gives color to trade optimism for improvement this year. Export business, largely tinged by armament needs abroad, shows no signs of recession and is from both near Far Eastern and European sources.

Inquiry continues unabated and adds to optimism since requests show definite retooling desires of machine users. Plant operations are steady at about a 50 per cent average with one or two factories running night shifts for part of the week.

New Orders Back Up Increased Optimism

CLEVELAND—A marked increase in demand for boring mills has been one of the notable developments in the local market, along with increased optimism at the start of the new year. Recent business includes lathes for Detroit, a few Government awards which have enlivened the year-end in Ohio, and movement of a number of pieces of toolroom equipment. Nickel Plate Railroad has been in the market for a lathe, shaper and planer, motor driven saw table and 28-in. round column drill press for its Bellevue, Ohio, shops.

Defiance Machine Works, recently acquired by Toledo Scale Co., will continue the manufacture of machine tools, including drill presses and horizontal boring mills.

Cleveland Planer Co. has sold two open-side planers with attachments to an Eastern shipyard for Government work. Four months will be required for completion. National Tool Co. recently reported unfilled orders, largely automotive, are double those of a month ago.

Inquiries Yet to Emerge For 1940 Model Production

DETROIT—The break has not yet come for machine tool dealers in the Detroit area, but it is known that several 1940 models on the drawing boards are nearing the stage where inquiries for equipment will come out. Opinion is that it is still a matter of weeks, however.

Inquiries Back Up Improved Sentiment in Mid-West

CHICAGO—A noticeable improvement in sentiment has been reported by some machine tool sellers in this area. Concrete evidences of better business have not yet been seen, but inquiries are being received, and a few orders have come in. The general feeling is that a considerable pickup will be felt soon, now that Congress again is in session and businessmen are able to predict for themselves what the legislative attitude toward them is likely to be in 1939.

Proposals are being tabulated by the International Harvester Co. following the inquiries sent out in connection with their large program of retooling. It is believed that some awards will be made next week.

A recent survey of machine tool plants in the vicinity of Chicago, including Milwaukee, Fond du Lac, Rockford and Madison, reveals a definite condition of spottiness. Some plants are running three shifts daily while others have almost no business. The more fortunate plants are occupied mostly with foreign orders, interspersed with a few domestic requirements. It was noticed also that manufacturers of single-purpose machines were less busy than those plants making general purpose equipment. Considerable equipment has lately been sold by a Rockford builder to various schools throughout the country for use in vocational classes.

Inquiry Volume Points to Early Buying in the East

NEW YORK—Except for builders of heavy machinery, all classes of machine tool sellers are definitely in an optimistic frame of mind in this area. The volume of inquiries has gained sharply in recent weeks, including requests for quotation on multiple units for the first time in more than a year. As has been the case for some time, however, much of this buying interest is on the part of firms with Government contracts of one kind or another. Recent orders have been coming from the same sources also, several concerns with shell contracts having bought turret lathes for turning shells of large caliber. Orders for the first week in January were light, but early closures on present inquiries are expected to make the month's bookings substantial, according to some.

The Navy Department's Bureau of Supplies and Accounts has awarded an $18,962.86 contract to the Jones & Lamson Machine Co., Springfield, Vt., for one grinder; and a $6,968 contract to the Pratt & Whitney Division, Niles-Bement-Pond Co., Hartford, Conn., for machines, radial, parts and tools.

Steel Cartel Modifies Agreement With U. S. Producers

LONDON (*By Mail*)—The Joint Coordinating Committee of the International Steel Cartel at its recent Paris meeting decided that prices would remain unchanged. Furthermore, it was declared that the existing production quotas will not be changed before 1940. The meeting was attended by 67 delegates.

A number of problems arising out of the working of the existing agreements between the Cartel and the steel producers in certain countries, including the United States, South Africa, Poland and other European countries, were discussed. These arrangements are said, on the whole, to be working satisfactorily. However, certain small readjustments in the interpretation of the agreement with the United States producers were asked for by the latter and agreed to by the meeting.

No settlement has yet been reached of the difficult problems raised by the transfer to neighboring countries of Czechoslovakian territory containing important steel mills. The view of the Cartel committee would appear to be that this is a question to be settled directly between the interested parties, namely, Germany, Czechoslovakia and Poland. The principal problem is that of organizing the outlet for Poland's production, which is now increased approximately 50 per cent owing to the presence in the ceded Teschen territory of two of the most important of the former steel mills of Czechoslovakia. This problem appears to defy any hasty solution.

Exports (In Gross Tons)

	November		Eleven Months Ended November	
	1938	1937	1938	1937
Pig iron	38,383	26,225	412,229	745,891
Ferromanganese and spiegeleisen	8	57	241	1,686
Other ferroalloys[4]	17	.....	18	52
Scrap, iron and steel	448,020	254,072	2,834,343	3,720,127
Scrap, tin plate	1,415	774	15,347	26,584
Waste-waste tin plate	566	465	6,703	26,108
Pig iron, ferroalloys and scrap	*488,435*	*281,673*	*3,269,906*	*4,522,814*
Ingots, blooms, billets, sheet bars	3,101	36,064	149,733	267,307
Ingots, etc., alloy steel, incl. stainless	323	167	7,538	7,179
Skelp	24,706	1,965	52,247	75,854
Wire rods	1,600	6,445	21,976	57,195
Semi-finished steel	*29,730*	*44,641*	*231,494*	*407,535*
Bars, plain and reinforcing	10,971	16,810	130,516	132,966
Bars, alloy steel	1,622	482	5,539	5,813
Bars, stainless steel	5	4	552	194
Iron bars	42	155	1,317	2,156
Plates, plain and fabricated	21,141	33,324	200,135	381,305
Plates, alloy steel	784	2,584	2,976	4,988
Plates, stainless	8	.....	260	138
Sheets, galvanized steel	5,910	6,680	64,990	69,577
Sheets, galvanized iron	395	483	3,462	4,790
Sheets, black, plain steel	21,984	25,814	176,785	259,312
Sheets, alloy steel	34	30	3,214	4,649
Sheets, stainless	60	406	1,621	1,142
Sheets, black iron	406	596	6,695	10,408
Hoops, bands, strips, plain steel	5,754	6,977	54,789	101,083
Hoops, bands, strip steel, alloy	40	62	395	1,097
Hoops, bands, strip steel, stainless	83	66	570	589
Tin plate and taggers' tin	10,908	52,795	146,491	322,975
Terne plate (including long ternes)	341	212	4,090	4,636
Structural shapes, plain material	6,916	9,689	77,484	127,646
Structural material, fabricated	3,398	5,058	36,112	37,102
Sheet piling	526	378	3,390	6,820
Tanks, steel	1,714	3,099	35,395	32,032
Steel rails	4,349	26,475	77,624	119,586
Rail fastenings, switches, spikes, etc.	1,029	3,815	12,022	18,919
Boiler tubes	432	3,439	11,861	16,397
Casing and oil line pipe	4,368	8,149	62,117	86,655
Pipe, black and galv., welded steel	2,361	2,817	22,228	36,917
Pipe, black and galv., welded iron	444	237	4,960	6,174
Plain and galvanized wire	5,881	3,232	45,256	52,917
Barbed wire and woven wire products	4,064	1,873	34,052	36,485
Wire rope and other products	1,129	896	9,493	15,420
Nails and tacks	2,664	1,023	23,063	19,765
Bolts, nuts, rivets and washers except track	665	779	7,308	10,421
Other finished steel	182	338	2,871	2,668
Rolled and finished steel	*120,610*	*218,777*	*1,269,633*	*1,933,742*
Cast iron pipe and fittings	3,758	2,006	29,770	28,799
Malleable iron screwed fittings	183	724	2,789	5,118
Carwheels and axles	1,872	7,382	20,340	21,426
Castings, iron and steel	671	490	5,954	11,145
Castings, alloy steel, incl. stainless	225	68	900	1,503
Forgings, plain	492	797	7,448	8,543
Forgings, alloy steel, incl. stainless	181	33	939	814
Castings and forgings	*7,382*	*11,500*	*68,140*	*77,348*
Total	646,157	556,591	4,839,173	6,941,439

Imports (In Gross Tons)

	November		Eleven Months Ended November	
	1938	1937	1938	1937
Pig iron	1,493	6,661	31,851	102,569
Sponge iron	56	101	436	1,635
Ferromanganese[1]	2,571	350	16,792	23,566
Spiegeleisen	5,056	438	14,827	17,554
Ferrochrome[2]	.....	.....	100	260
Ferrosilicon[3]	69	138	679	2,867
Other ferro-alloys[4]	17	.....	18	52
Scrap	4,749	3,011	17,932	80,952
Pig iron, ferroalloys and scrap	*14,011*	*10,699*	*82,638*	*229,455*
Steel ingots, blooms, etc.	7	.....	204	130
Billets, whether solid or hollow	23	33	514	1,854
Wire rods	803	1,405	4,800	15,184
Semi-finished steel	*833*	*1,438*	*5,518*	*17,168*
Concrete reinforcement bars	114	43	1,215	3,809
Hollow steel bars	133	188	816	2,347
Merchant steel bars	1,730	1,811	17,044	41,729
Iron slabs	.....	.....	.....	1
Iron bars	33	123	485	1,866
Boiler and other plate (incl. skelp)	53	1	356	214
Sheets, skelp, and saw plate	182	57	6,011	8,542
Die blocks or blanks, etc.	22	3	93	101
Tin plate	10	27	101	233
Structural shapes	3,798	3,968	35,768	72,617
Sheet piling	.....	.....	235	2,161
Rails and track material	299	320	3,340	8,133
Welded pipe	440	713	5,367	8,792
Other pipe	1,709	2,082	21,494	30,811
Cotton ties	.....	.....	8,692	454
Other hoops and bands	1,658	1,582	15,296	24,819
Barbed wire	559	1,446	11,789	16,075
Round iron and steel wire	252	250	1,420	4,381
Telegraph and telephone wire	7	.....	16	17
Flat wire and steel strips	302	669	2,397	3,771
Wire rope and strand	157	188	1,907	3,315
Other wire	208	97	1,386	3,182
Nails, tacks, and staples	842	552	6,923	14,599
Bolts, nuts, and rivets	21	16	207	562
Horse and mule shoes	25	18	404	397
Rolled and finished steel	*12,554*	*14,154*	*142,762*	*252,928*
Malleable iron pipe fittings	.....	12	76	416
Cast iron pipe and fittings	148	514	1,373	3,243
Castings and forgings	81	179	3,420	4,158
Total	27,627	26,996	235,784	507,368

[1] Manganese content; [2] chrome content; [3] silicon content; [4] alloy content.

Iron-Steel Exports Down—Scrap Shipments Double

NOVEMBER exports of iron and steel products other than scrap registered a slight decline in comparison with October, according to preliminary figures released by the Metals and Minerals Division of the Bureau of Foreign and Domestic Commerce. The November export trade amounted to 296,156 gross tons, valued at $11,522,717, compared with 201,477 tons in October. Shipments in the 11 months totaled 1,982,780 tons against 3,168,620 in the comparable period of 1937.

Leading products exported in November were pig iron, skelp, black steel sheets, plates and tin plate and taggers' tin.

At 22,878 gross tons, imports of iron and steel products in November topped October's 20,921-ton total by 9.3 per cent. Over the 11-month period 217,852 tons of iron and steel products has been imported, compared with 426,416 tons in the similar 1937 period.

Exports of scrap totaled 450,001 tons in November, more than doubling the October total of 223,954 tons. Leading markets in that month were Japan (319,943 tons), Italy (55,446 tons), and Germany (30,515 tons). Scrap exports in the first 11 months of 1938 totaled 2,856,393 tons.

November Imports of Iron and Manganese Ores

(In Gross Tons)

	Iron Ore		Manganese Concentrates, 35 Per Cent or Over	
	1938	1937	1938	1937
Canada	....	167	....	....
Cuba	21,000	20,000	4,137	5,413
Chile	129,800	85,600	....	....
Spain	....	....	....	....
Norway	7,089	8,007	....	....
Sweden	13,983	37,951	....	....
French Africa	....	....	....	....
Russia	....	....	4,716	3,875
India	....	....	923	....
Brazil	6,850	....	3,871	....
Gold Coast	....	....	9,831	....
Other countries	19,038	5,249	....	6,955
Total	197,760	158,974	23,478	16,243

United States Imports of Pig Iron by Countries of Origin

(In Gross Tons)

	November		Eleven Months End. November	
	1938	1937	1938	1937
United Kingdom	....	....	42	100
British India	149	5,286	12,114	63,161
Germany	....	....	....	510
Netherlands	1,158	1,001	14,086	26,270
Canada	36	374	1,866	6,472
France	....	....	....	....
Belgium	....	....	....	....
Norway	....	....	3,538	875
Sweden	150	....	205	600
Russia	....	....	....	4,581
Other countries	....	....	....	....
Total	1,493	6,661	31,851	102,569

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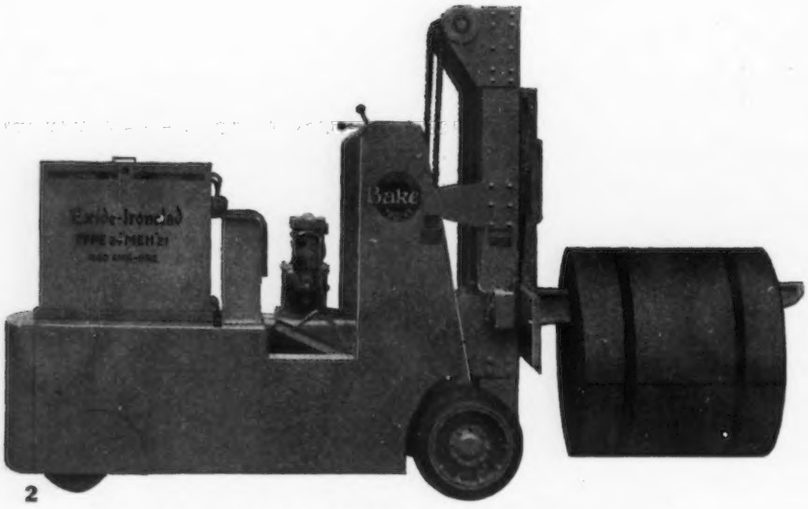

2

1—Truck made by The Yale & Towne Manufacturing Co.
2—Truck made by Baker-Raulang Company
3—Truck made by Automatic Transportation Co., Inc.
4—Truck made by The Elwell Parker Electric Company

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